

# TWOWAYCARDIOID® Dynamic Microphone

## D 202 E1



The non-reflective black housing finish prevents light reflections and therefore makes the D 202 an ideal studio microphone, especially suited for recording work in TV, motion picture, and broadcasting studios. Outdoor use, even in cold environments is facilitated by the housing with low thermal conductivity. A compensation coil eliminates influences of magnetic stray fields. Wide-range frequency response, independent of working distance and angle of sound incidence. The built-in three-position bass-cut switch (0, -7, -20 dB at 50 Hz) reduces rumble and handling noise. The microphone is also recommended for picking up percussion instruments in front of loudspeakers or electronic musical instruments.

### Included Accessories:

SA 16 Stand adapter

### Optional Accessories:

MK 9/10 10 metre connecting cable  
St 102 A, St 200 Floor stands  
St 1, St 5, St 12, St 305 Table stands  
W 29 + W 9A Foam windscreens  
H 10 Stereo bar  
SA 18/9, SA 26 Stand adapters  
H 30 Elastic suspension

### Technical Data:

- Type: Double element pressure gradient receiver
- Directional characteristics: frequency independent cardioid
- Frequency range: 20 to 20,000 Hz
- Sensitivity at 1,000 Hz: 1.6 mV/Pa (0.16 mV/ $\mu$ b)  $\Delta$  -76 dBV ref. 1  $\mu$ b.
- Impedance at 1,000 Hz: 300 ohms
- Max. sound pressure for THD of 0.5%: 30 Pa  $\Delta$  124 dB SPL
- Hum sensitivity at 50 Hz: 3  $\mu$ V/5  $\mu$ T at 100 Hz: 6  $\mu$ V/5  $\mu$ T
- Permissible climatic conditions: temperature range: -10° C to +60° C relative humidity: 90% (20° C to 60° C)
- Connector: 3-pin XLR-type
- Bass-cut filter: switchable to 0, -7, -20 dB at 50 Hz
- Housing material: special plastic compound with non-reflective black finish
- Dimensions: 52  $\varnothing$  x 218 mm (2.05  $\varnothing$  x 8.6 inch)
- Net weight: 320 g (11.3 oz)
- Shipping weight: 700 g (1.5 lb)

## D 222



A versatile TWOWAYCARDIOID® microphone using two microphone elements connected by a crossover network. This technique eliminates the usual proximity effect and consequently, the sound will not depend on working distance or angle of incidence. The built-in three step bass-cut (0, -6 and -12 dB at 50 Hz) reduces low-frequency noise. The microphone provides for a balanced sound ideally suiting horns, strings and pianos. It also results in a very natural bass drum sound.

### Included Accessories:

SA 41/1 Stand adapter

### Optional Accessories:

H 10 Stereo bar  
H 30 Elastic suspension  
W 29 + W 29 A Foam-type windscreens for front and rear sound entry

### Technical Data:

- Transducer type: Double element pressure gradient receiver
- Directional characteristics: Frequency independent cardioid
- Frequency range: 20 to 18,000 Hz
- Sensitivity at 1,000 Hz: 1.5 mV/Pa (0.15 mV/ $\mu$ b)  $\Delta$  -76.5 dBV ref. 1  $\mu$ b.
- Impedance at 1,000 Hz: 320 ohms
- Max. sound pressure for 0.5% THD: 30 Pa  $\Delta$  124 dB SPL
- Hum sensitivity at 50 Hz: 3  $\mu$ V/5  $\mu$ T
- Bass-cut filter: switchable to 0, -6 and -12 dB at 50 Hz
- Permissible climatic conditions: Temperature range: -10° C to +60° C Relative humidity: 90% (20° to 60° C)
- Connector: 3-pin XLR-type
- Housing material: special plastic compound with non-reflective black finish
- Dimensions: 45  $\varnothing$  x 205 mm (1.8  $\varnothing$  x 8.1 inch)
- Net weight: 250 g (8.8 oz)
- Shipping weight: 700 g (1.5 lb)



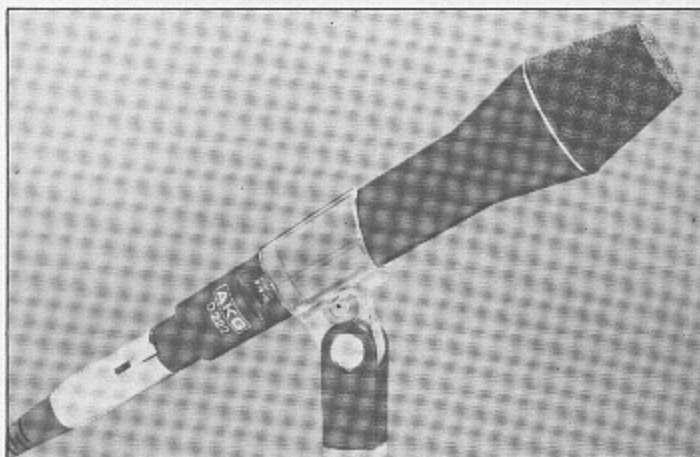
## DESCRIPTION

The D-222EB is a refined, physically scaled-down version of the classic D-202E, and succeeds it as the most versatile member of AKG's unique family of two-way cardioid dynamic microphones\*. A superb speech, instrumental, choral, orchestral or flat (non-bass-boost) vocal mic, the D-222EB couples extended range and low distortion with an almost theoretically perfect cardioid pattern and no proximity effect. The microphone also features switchable bass rolloff, internal shock suspension and easy-to-service modular construction. These combined traits make the D-222EB equally at home in the best or worst acoustic environments likely to be encountered in recording, broadcasting, sound reinforcement and film/videotape production — either indoors or outdoors, whether hand-held or stand/boom/lectern-mounted.

The microphone is the product of an intensive AKG research program that has succeeded in finding a way to transcend the performance limitations of conventional cardioid designs. It employs *two*, coaxially mounted, dynamic transducers: one designed for optimum performance at high frequencies, placed closest to the front grille and facing forward; the other designed for optimum performance at low frequencies, placed behind the first and facing rearward. The low-frequency transducer incorporates a hum-bucking winding to cancel the effects of stray magnetic fields. Both transducers are coupled to a 500-Hz inductive-capacitive-resistive crossover network that is electroacoustically phase corrected and factory-preset for most linear off-axis response. (This is essentially the same design technique used in a modern two-way speaker system, but applied in reverse.)

As a result, the D-222EB exhibits several outstanding characteristics that make it vastly superior to conventional cardioid dynamic microphones for its intended applications: (1) an exceptionally smooth and wide-range on-axis frequency response — resembling that of a condenser microphone at frequencies up to 14 kHz; (2) a predominantly frequency-independent directional pattern — producing more linear frequency response at the sides of the microphone and far more constant discrimination at the rear of the microphone; (3) a total absence of proximity effect at working distances down to 15 cm ( $\approx 6$  in.); (4) extremely low harmonic distortion at high sound-pressure levels.

In all applications — recording, broadcasting and sound reinforcement — these qualities contribute to more natural, uniform and uncolored tonal quality, *regardless of the relative position or distance of performers and instruments within a*



*semicircle around the front and sides of the microphone.* Furthermore, stereo separation is improved and greater isolation (lower leakage) is achieved in multiple-microphone installations. In sound-reinforcement applications, these same qualities also permit greater freedom in microphone and speaker placement, more effective and predictable suppression of acoustic feedback and higher overall system gain.

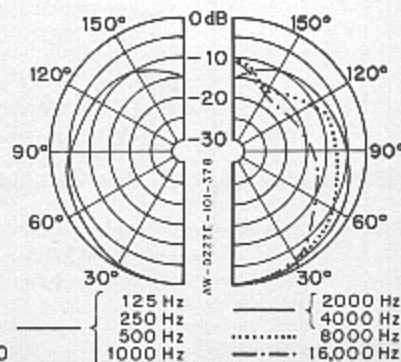
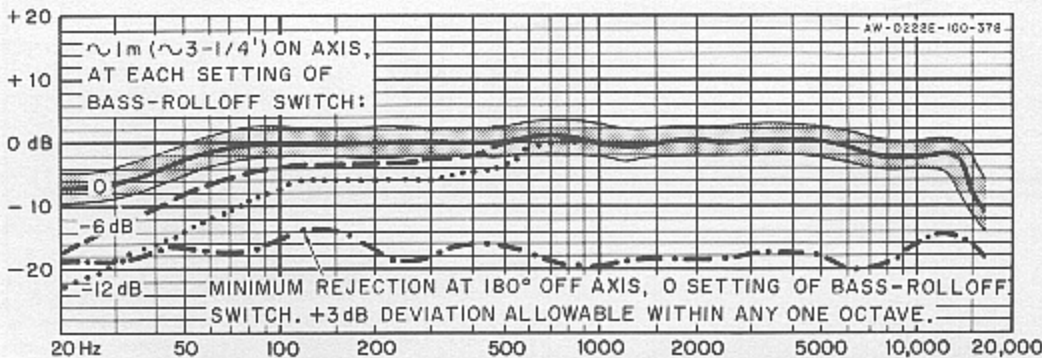
A built-in three-position bass-rolloff switch provides an additional 6 dB or 12 dB attenuation at 50 Hz, as required. This feature is especially useful in speech applications and in acoustically unfavorable environments with excessive low-frequency ambient noise, reverberation or feedback.

To simplify field service, the transducers and crossover network are housed in a replaceable *slide-in* module that can be reached simply by unscrewing the microphone's distinctively shaped windscreen/pop filter. Both transducers are elastically suspended within the module, making the D-222EB relatively immune to handling noise, mechanical shocks and spurious vibrations. The sintered-bronze windscreen and impact-resistant case are finished in black for minimum reflectivity, and encapsulate all internal parts against metal particles, dust and moisture spray.

The D-222EB is a low-impedance balanced-output unit fitted with a standard 3-pin male XLR-type connector. Each microphone is supplied complete with individual proof-of-performance curves (showing measured frequency response on axis and discrimination vs. frequency at 180 degrees off axis), an SA-12/1-Black stand adapter and a foam-lined vinyl protective case. Several optional accessories — listed in the Technical Data section — are available.

\*U.S. Patent No. 3,204,031

## FREQUENCY AND POLAR RESPONSE



## TECHNICAL DATA

Transducer Type: Dynamic, two-way system  
Directional Characteristic: Cardioid  
Frequency Range: 20-16,000 Hz (bass-rolloff switch at 0)  
Crossover Frequency: 500 Hz  
Nominal Impedance: 200 ohms  
Recommended Load Impedance:  $\geq 500$  ohms  
Sensitivity at 1 kHz:  
Open circuit: 0.15 mV/ $\mu$ b;  $-76.5$  dBV  
Maximum power level:  $-55.5$  dBm (re: 1 mW/10 dynes/cm<sup>2</sup>)  
EIA  $G_m$ :  $-148$  dBm  
Tolerance:  $+0, -1.5$  dB  
Sound Pressure Level for 0.5% THD:  
40 Hz: 124 dB  
1000 Hz: 124 dB  
Hum Sensitivity:  $-142$  dBm (1 mG field)

Case Material: Black polymer, zinc and sintered bronze  
Dimensions: See Dimensions figure below  
Schematic: See Schematic figure on facing page  
Net Weight: 250 g ( $\approx 9$  oz)  
Included Accessories:  
SA-12/1-Blk metal-base stand adptr with 5/8-in.  $-27$  thread  
Foam-lined vinyl case  
Optional Accessories:  
SA-26 clothespin stand adapter with 5/8-in.  $-27$  thread  
H-9 clamp for surface-mounting or hanging H-10 below  
H-10 stereo bar for stand-mounting two microphones  
W-29, W-29A front and rear foam windscreens (set)  
KM-series floor and boom stands, stand accessories  
ST-series table stands  
MCH-series heavy-duty cable assemblies

## ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The microphone shall be a dynamic pressure-gradient type incorporating a two-way electroacoustical system. The two-way system shall consist of two coaxially mounted transducers and an inductive-capacitive-resistive crossover network.

One transducer shall be designed for optimum pickup and reproduction of high frequencies, shall be positioned closest to the front port of the microphone, and shall face forward. The second transducer shall be designed for optimum pickup and reproduction of low frequencies, shall be positioned behind the first (high-frequency) transducer, and shall face rearward. The second (low-frequency) transducer shall incorporate a hum-bucking winding to cancel the effects of stray magnetic fields. The two transducers shall be connected to the crossover network electrically out of phase but, because of their opposed facing, shall operate electroacoustically in phase.

The crossover network shall have an electrical crossover frequency of 500 Hz, shall be electroacoustically phase corrected in the crossover-frequency region, and shall consist of a capacitive high-pass filter plus an inductive-capacitive low-pass "T" filter having an adjustable resistor in series with its shunt capacitor. The resistor shall be factory-preset to produce the linear off-axis frequency response specified in a subsequent paragraph.

The microphone shall have a normal frequency range of 20-16,000 Hz, and shall not exhibit proximity effect at any working distance down to 15 cm ( $\approx 6$  in.). The microphone shall incorporate facilities for adjusting its low-frequency response characteristics. These facilities shall consist of a tapped inductance and a low-noise SP3T selector switch, and shall affect bass rolloff as follows: (1) the "0" position of the switch shall disconnect the inductance completely to produce the microphone's normal 2-dB rolloff at 50 Hz; (2) the " $-6$  dB" position of the switch shall connect the entire inductance in parallel with the two-way electroacoustical system to produce an additional 6-dB rolloff at 50 Hz for a total attenuation of 8 dB at that frequency; (3) the " $-12$  dB" position of the switch shall connect a tapped portion of the inductance in parallel with the two-way electroacoustical system to produce an additional 12-dB rolloff at 50 Hz for a total attenuation of 14 dB at that frequency.

The microphone shall have a predominantly frequency-independent cardioid directional pattern throughout most of its frequency range as follows: (1) typical off-axis frequency response shall not vary more than 2-3 dB from 125-8000 Hz at a sound-incidence angle of 90 degrees; (2) front-to-rear discrimination shall exceed 19 dB at 1000 Hz at a sound-incidence angle of 180 degrees, and shall not vary more than 7 dB from 125-8000 Hz.

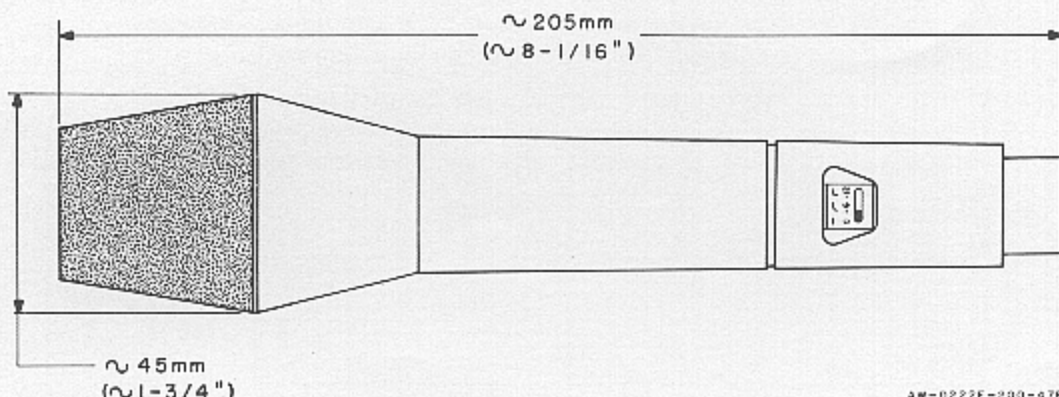
The microphone shall have a nominal impedance of 200 ohms. The output level shall be  $-55.5$  dBm (re: 1 mW/10 dynes/cm<sup>2</sup>), and the microphone shall be capable of handling a maximum sound-pressure level of 300  $\mu$ bar (124 dB SPL) at 1000 Hz with distortion not exceeding 0.5%. The EIA sensitivity rating ( $G_m$ ) shall be  $-148$  dBm.

An integral sintered-bronze windscreen and pop filter, commensurate with the acoustical properties of the unit, shall protect the microphone system from metal particles, dust, and moisture spray. To facilitate field service, the windscreen shall be screw-threaded and removable, while the transducers and crossover network shall be packaged in a replaceable slide-in module having electrical contacts to mate with contacts in a receptacle within the microphone housing. The transducers shall be elastically suspended within the replaceable module to isolate them from the effects of handling noise, mechanical shocks, and spurious vibrations. The diaphragm material of each transducer shall be nonmetallic MAKROFOL.

The microphone shall incorporate a 3-pin male audio connector designed to mate with Cannon XLR, Switchcraft A3, or equivalent connectors. A set of individual proof-of-performance curves (showing frequency response on axis and discrimination vs. frequency at 180 degrees off axis), an AKG model SA-12/1-Black swivel stand adapter with standard 5/8-in.  $-27$  thread, and a foam-lined vinyl carrying case shall also be provided. The finish of the microphone shall be matte black and shall not create specular light reflections.

The microphone shall be 205 mm ( $\approx 8-1/16$  in.) long by 45 mm ( $\approx 1-3/4$  in.) in windscreen diameter, and the net weight shall not exceed 250 g ( $\approx 9$  oz). The microphone herein specified shall be the AKG D-222EB.

## DIMENSIONS



AW-D222E-200-478