

## DESCRIPTION

**INTRODUCTION:** In a rather astonishing series of demonstrations conducted throughout the U.S., AKG recently put inventory samples of its new D-300 Series microphones through an incredible ordeal of abuse. Sample units were intentionally dropped from heights of six feet or more, repeatedly struck against hard surfaces and purposely subjected to some of the most outrageous treatment ever inflicted on microphones. Despite incurring some cosmetic damage, each unit not only "bounced back" in working order but — even more important — *each performed with the sound quality and finesse normally associated only with a more delicate studio microphone.*

While AKG does not advocate intentional abuse of *any* microphone, it nonetheless held these demonstrations to dramatize an extremely important point: That, with the development of its D-300 Series, it has succeeded in creating a radically new and vastly superior generation of musicians' and broadcast microphones — the very first instruments of their kind to successfully blend the wide-range response of a studio microphone *and* the virtually indestructible toughness of a field microphone *with* one of the most comprehensively effective systems of shock/noise rejection ever devised. Further enhancing these combined factors are the D-300s' distinctive styling, comfortable balance and easy-to-service *modular* construction.

These remarkable design goals were achieved only by breaking away from established industry concepts. After carefully evaluating the real-world needs of touring vocalists, instrumentalists *and* their sound engineers, AKG developed several unique (and patented) acoustical, electrical and mechanical configurations from the ground up to meet those needs.

As a result, the D-300 Series is a family of microphones that will surely set *the* performance standards of the pop-music and broadcast industries for years to come. Elegant, yet bulldog-tough, these units are capable of satisfying the most subtle artistic demands in the studio while shrugging off the daily abuse, rough handling and various forms of noise that are all too common in remotes, road shows, club dates and the like. Furthermore, the D-300s' simplified field-serviceability now makes it unnecessary to carry an arsenal of bulky and expensive backup microphones on tour.

**PERFORMANCE:** The D-310 is the least expensive model in the D-300 Series, yet it embodies many of the uniquely sophisticated design principles that went into the creation of the



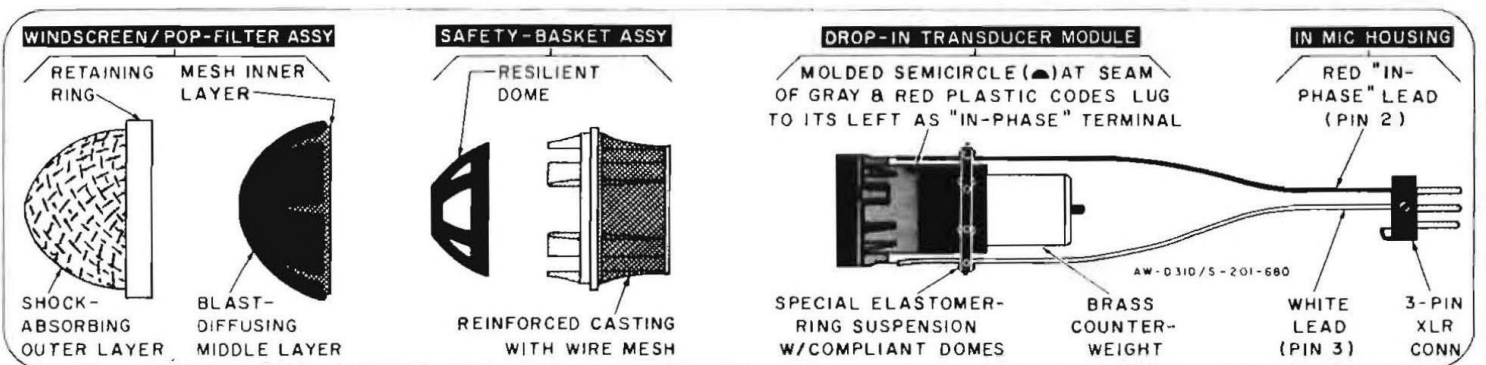
series. A fully professional instrument whose frequency range, transient response and tonal flexibility are comparable to those of studio dynamics, the D-310 offers truly exceptional value — both to the established headliner and to the emerging performer on a restricted budget.

With its variable bass-versus-distance contour (marked bass emphasis or "proximity effect" when used close up; progressively diminishing bass response when used farther away) and smooth presence-rise contour (for added crispness and "punch"), the D-310 is a *highly* creative tool — one that offers its users flexible personal control over the tonal "shading" of voices or instruments to suit a variety of locales, or musical moods and styles.

In addition, the D-310's cardioid directional pattern is *unusually* uniform with respect to frequency. This uniformity — extremely important in broadcasting and utterly indispensable for sound reinforcement — produces negligible coloration of desired sounds at the sides of the microphone while providing exceptional (and highly predictable) suppression of unwanted acoustic feedback and background noise towards the rear of the microphone.

**DESIGN/CONSTRUCTION:** What sets the D-310 apart, however, is not merely its outstanding performance. Rather, it is the *combination* of that performance with its unmatched ruggedness, highly effective noise-rejection capabilities, fatigue-free handling, comfortable balance and exceptional ease of field service. The key to *all* of these factors is readily apparent in the exploded view below and in the detailed "walking-tour" description that follows overleaf.

## SPECIAL DESIGN AND CONSTRUCTION TECHNIQUES





## DESCRIPTION (Continued)

The microphone's unique design and construction begin with an unusually sturdy *three-layer* windscreen/pop-filter assembly. This assembly consists of a shock-absorbing stainless-steel wire-mesh outer layer, a blast-diffusing fabric middle layer and phosphor-bronze wire-mesh inner layer (sandwiched together into a removable liner) plus a threaded retaining ring that secures the entire unit to the microphone housing. So effective is this combination in reducing the effects of wind noise, breath pop and similar acoustic interference, that an external windscreen or pop filter is seldom, if ever, required.

As tough as the windscreen/pop filter is alone, it is *further* reinforced against impact damage by a special two-piece safety-basket assembly. Note that the safety basket is contoured to support the inside of the windscreen/pop filter *and* to surround the front of the transducer system — thus also isolating all *internal* parts from head-on impact damage. As shown, the safety basket consists of a resilient dome-shaped ribbed cage mated with a reinforced open-frame casting. The casting, in turn, is fitted with a fine-wire-mesh screen that coincides with side ports in the microphone housing.

Next in line is the advanced transducer system. In terms of its superb performance, its very thorough shock and noise suppression and its modular field-serviceable packaging, the system is a prime example of the care and the attention to detail that AKG engineers lavished on the D-310.

To start with, the transducer system "floats" uniformly in *all* directions within the microphone housing for *unprecedented* isolation from the effects of impact damage, handling noise and spurious vibrations. This is achieved by a special ring-shaped elastomer suspension *around* the system at its center of mass, in conjunction with a brass counterweight at the *rear* of the system that establishes neutral balance of mass. To combine the advantages of both hard *and* soft suspension designs, this ring suspension has a dense, relatively hard body and a series of compliant, *progressively* compressible dome-shaped projections around its periphery — in effect forming a complex, highly damped low-pass mechanical filter. Therefore, under normal handling conditions, the compliant domes effectively decouple

the transducer system from mechanically *and* motionally induced vibration. Further, under extremely abusive conditions (dropping the microphone or subjecting it to lateral impact), the domes increasingly compress, in proportion to applied g-force, in a progressive *braking* action — ultimately allowing the harder body of the suspension to act as a bumper.

The transducer, computer designed for widest possible frequency range and superb transient response, is encapsulated in a replaceable drop-in module. Injection-molded of stress-resistant thermoplastic, the module is fitted with two readily accessible solder lugs. These serve as convenient connection points for the color-coded leads that are part of the connector assembly within the microphone housing.

The microphone housing itself is a lightweight, yet impact-resistant zinc-alloy casting — elegantly styled, carefully balanced and finished in glare-free matte nickel. For maximum wear resistance, the finish is *electroplated* (not merely painted, as on competitive microphones). In conjunction with the windscreen/pop filter and the safety basket, this housing effectively encapsulates all internal parts against metal particles, dust and moisture spray.

Should field service ever become necessary, the windscreen/pop filter can be quickly unscrewed, the two-piece safety basket easily lifted out, and the transducer module removed for replacement simply by unsoldering the two color-coded leads, removing the module's ring suspension (to free the leads), and withdrawing the module from the microphone housing. Spare assemblies and parts are readily available, and the "in-phase" lugs of all replacement transducer modules are specially coded as shown for ease of polarity identification.

The D-310S is identical to the D-310, but incorporates a noiseless, rugged and *lockable* on/off switch. Both microphones are low-impedance balanced-output units, each fitted with a standard 3-pin male XLR-type connector. Each microphone is supplied complete with an SA-31 stand adapter and a foam-lined vinyl protective case. Several optional accessories — listed in the Technical Data section — are available.

## TECHNICAL DATA

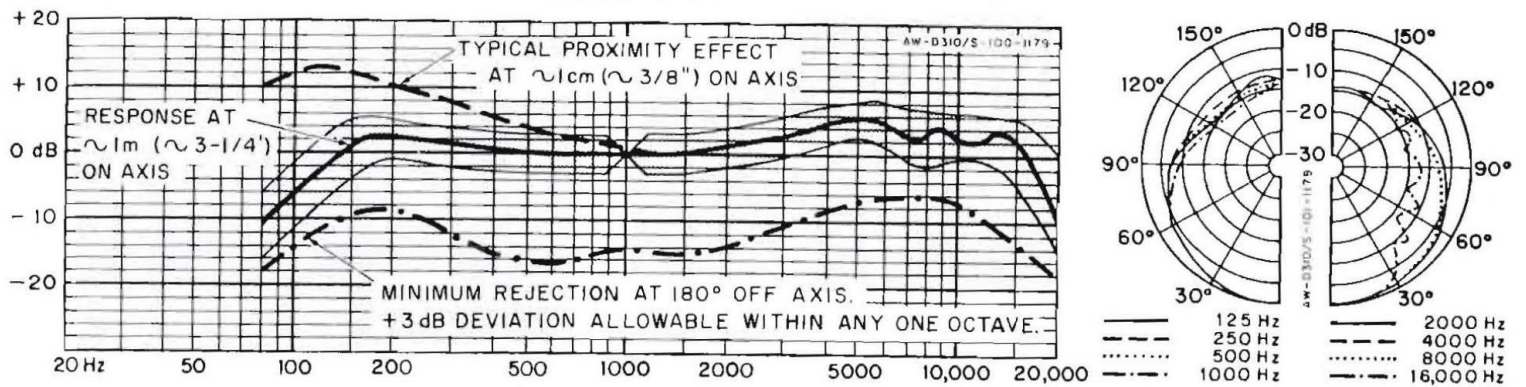
Transducer Type: Dynamic  
Directional Characteristic: Cardioid  
Frequency Range: 80-18,000 Hz  
Nominal Impedance at 1 kHz: 270 ohms  
Rated-Impedance Category: 250 ohms  
Recommended Load Impedance:  $\geq 600$  ohms  
Sensitivity at 1 kHz:  
Open circuit: 1.3 mV/Pa; -57.7 dBV\*  
Maximum power level: -57.5 dBm (re: 1mW/10 dynes/cm<sup>2</sup>)  
EIA G<sub>m</sub>: -149.5 dBm  
High-Z output w/MCH-20T,-20TS (optional): -47.5 dBV at 1 Pa\*  
Tolerance: +2, -1.5 dB  
Sound Pressure Level for 1% THD:  
40 Hz, 1000 Hz, 5000 Hz: 128 dB

Hum Sensitivity (1 mG field): -142 dBm  
Case Material: Nickel-plated die-cast zinc alloy  
Dimensions: See Dimensions figure  
Schematic: See Schematic figure  
Net Weight: 255 g (≈9 oz)  
Included Accessories:  
SA-31 flex. snap-in stand adapter with 5/8-in. -27 thread  
Foam-lined vinyl case  
Optional Accessories:  
SA-26 clothespin stand adapter with 5/8-in. -27 thread  
PF-10 foam pop filter (red, blue, yellow, off-white, gray)  
GN-7E, GN-14E, GN-20E modular flexible-gooseneck kits  
KM-series floor and boom stands, stand accessories  
ST-series table stands  
MCH-series heavy-duty microphone cable assemblies

\*1 Pa (Pascal) = 10 μb = 10 dynes/cm<sup>2</sup> ≈ 94 dB SPL



## FREQUENCY AND POLAR RESPONSE



## ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

**OUTLINE:** The microphone shall be a dynamic pressure-gradient type. As specified in subsequent detail, it shall have a wide frequency range accompanied by a variable bass-versus-distance contour, a fixed presence-rise contour, and a highly uniform cardioid polar pattern with respect to frequency. As also specified in subsequent detail, it shall employ special modular design and construction techniques for exceptional resistance to impact damage and to noise (whether acoustically, mechanically, or motionally induced), for protection from foreign particles, for fatigue-free handling balance and comfort under prolonged use, and for exceptional ease of field service.

**PERFORMANCE:** The microphone shall have a frequency range of 80-18,000 Hz, accompanied by the following on-axis characteristics: (1) an 18-dB variable bass-versus-distance contour at 100 Hz that shall range from -6 dB response rolloff at a working distance of 1 m ( $\approx 3\text{-}1/4$  ft) to +12 dB typical proximity-effect boost at a working distance of 1 cm ( $\approx 3/8$  in.); (2) a fixed presence-rise contour from 1500 Hz to 16,000 Hz that shall boost response +6 dB at 5000 Hz.

The microphone shall have a highly uniform cardioid directional pattern with respect to frequency as follows: (1) at a sound-incidence angle of 90 degrees, typical off-axis frequency response shall not vary more than 5-6 dB from 125-16,000 Hz; (2) at a sound-incidence angle of 180 degrees, minimum front-to-rear discrimination shall exceed 14 dB at 1000 Hz. An effective cardioid pattern shall be maintained over the entire frequency range.

At 1000 Hz, the microphone shall have an open-circuit sensitivity of 1.3 mV/Pa (-57.7 dBV) and a nominal (true) impedance of 270 ohms. However, in accordance with various industry standards for calculating other sensitivity figures from this open-circuit value, the microphone's rated impedance shall be categorized as follows: (1) for a maximum-power-level output of -57.5 dBm (re: 1 mW/10 dynes/cm<sup>2</sup>), the rated impedance shall be categorized as 250 ohms; (2) for an EIA sensitivity rating ( $G_m$ ) of -149.5 dBm, the rated impedance shall be categorized as 150 ohms. The microphone shall be capable of handling a maximum sound-pressure level of 50 Pa (128 dB SPL) at 1000 Hz with distortion not exceeding 1%.

**DESIGN/CONSTRUCTION:** To achieve all of the characteristics outlined or specified up to this point, the microphone shall consist of four special modular assemblies interrelated as follows: (1) a removable shock-absorbing three-layer windscreen/pop filter; (2) a removable two-piece safety basket, internally reinforcing the windscreen/pop filter and protecting the front of the transducer system; (3) a specially suspended drop-in module containing the transducer system; (4) an impact-resistant main housing, mating with the first three assemblies and containing the microphone's audio output connector. Specific details of all assemblies shall be as follows:

The three-layer windscreen/pop-filter assembly shall effectively suppress wind noise, breath pop, and similar acoustic interference, and shall also partially isolate the transducer module from the effects of head-on impact damage. The assembly shall consist of a shock-absorbing stainless-steel wire-mesh outer layer, a removable liner made up of a blast-diffusing fabric middle layer sandwiched with a phosphor-bronze wire-mesh inner layer, and an internally threaded retaining ring to mate the entire assembly securely with an external thread on the main housing.

The internal two-piece safety-basket assembly shall be specially contoured to fit supportively just inside the windscreen/pop filter and protectively around the front of the transducer module, thus reinforcing the windscreen/pop filter against, and additionally isolating the transducer module from, the effects of head-on impact damage. The two-piece safety basket shall consist of a resilient dome-shaped ribbed cage, mated with a reinforced truncated-conical open-frame casting fitted with fine-wire-mesh screen to coincide with side ports in the main housing.

To further isolate the transducer module from the effects of impact damage, as well as to reduce the effects of handling noise and spurious

vibrations, the entire module shall float uniformly in all directions within the main housing. This degree of isolation shall be achieved by means of a special ring-shaped elastomer suspension fitted around the module at its center of mass, in conjunction with a brass counterweight fitted to the module at its rear end to establish neutral balance of mass. To combine the advantages of both hard and soft suspension designs in the form of a complex, highly damped low-pass mechanical filter, this ring suspension shall have a dense, relatively hard body and a series of compliant, progressively compressible dome-shaped projections around its periphery that shall function as follows: (1) under normal handling conditions, the compliant domes shall effectively decouple the transducer module from mechanically and motionally induced handling noise; (2) under extremely abusive conditions (e.g., dropping the microphone or subjecting it to lateral impact), the domes shall increasingly compress, in proportion to applied g-force, in a progressive braking action that shall ultimately allow the harder body of the suspension to act as a bumper.

A moving-coil transducer element shall be positioned at the front end of the transducer module. The transducer element shall be computer-designed for widest possible frequency range and optimum transient response, and shall employ a nonmetallic MAKROFOL™ diaphragm. The body of the transducer module shall be injection-molded of stress-resistant thermoplastic, and shall be fitted near its front end with two readily accessible solder lugs spaced 180 degrees apart on its periphery. These solder lugs shall serve as convenient connection points for two color-coded leads originating at the audio output connector within the main housing. For ease of polarity identification during replacement, the transducer module's "in-phase" solder lug shall be specially coded by means of a nearby symbol as follows: in-line with the lug, at the seam of the module's gray and red segments, a small semicircle shall be molded into the gray segment.

The main housing shall incorporate a three-pin male audio output connector designed to mate with Cannon XLR, Neutrik 3FC, Switchcraft A3F, or equivalent connectors. On the solder-lug side of the connector, pin 2 shall have a permanently affixed red "in-phase" lead to correspond with the "in-phase" solder lug on the transducer module, pin 3 shall have a permanently affixed white lead to correspond with the other solder lug on the transducer module, and pin 1 shall have a permanently affixed shell-ground strap that shall contact the inside surface of the main housing. The main housing shall also incorporate an external thread to mate with the internal thread on the windscreen/pop filter. In conjunction with the windscreen/pop filter and the safety basket, the main housing shall protect the transducer module from metal particles, dust, and moisture spray. The main housing shall be a lightweight impact-resistant zinc-alloy casting, and shall have an electroplated matte-nickel finish for maximum wear resistance and for freedom from specular light reflections.

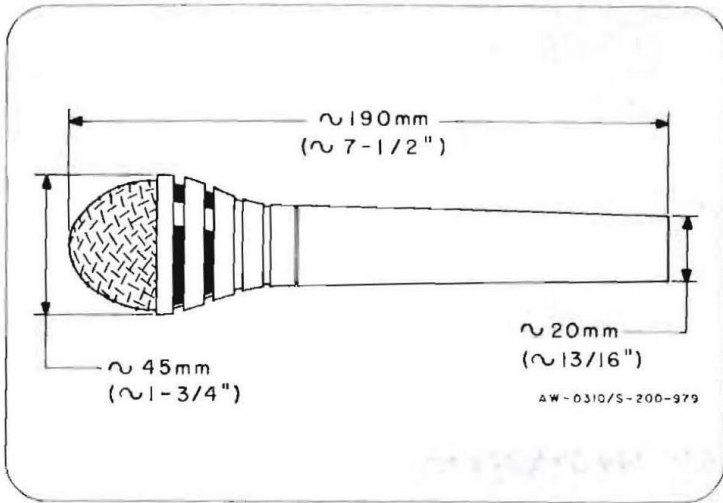
The assembled microphone shall be 190 mm ( $\approx 7\text{-}1/2$  in.) long by 45 mm ( $\approx 1\text{-}3/4$  in.) in maximum diameter by 20 mm ( $\approx 13/16$  in.) in minimum diameter, and the net weight shall not exceed 255 g ( $\approx 9$  oz). The microphone's weight distribution and shape shall be such that they promote fatigue-free handling balance and comfort under prolonged use. To facilitate field service, all four constituent assemblies of the microphone shall be quickly and easily separable for replacement or repair.

An AKG model SA-31 swivel stand adapter with standard 5/8-in. -27 thread, and a foam-lined vinyl carrying case shall be provided with the microphone. The microphone herein specified shall be the AKG D-310.

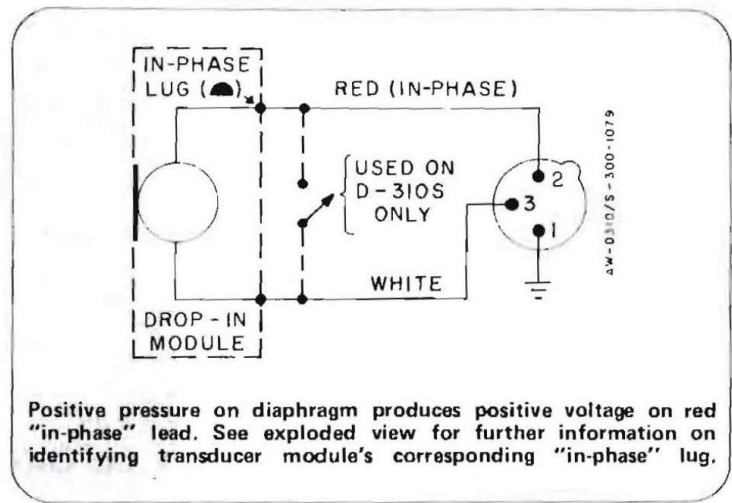
The microphone shall also be available in an alternate version employing an integral on/off switch capable of being locked into its on position if so desired. The switch shall be a low-noise SPST type, connected in parallel with the transducer element, in an arrangement that short-circuits both the transducer output and the associated amplifier input when the switch is off. The microphone herein specified shall be the AKG D-310S.



## DIMENSIONS



## SCHEMATIC



2145 Z 0001/20B

21-680-10MI



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