DESCRIPTION

INTRODUCTION: In a rather astonishing series of demonstrations conducted throughout the U.S., AKG recently put inventory samples of its new 0-300 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-300's 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-300's 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:

- Windscreen/Pop-Filter Assy
- Drop-in Transducer Module
- MOLDED SEMICIRCLE CAP AT SEAM OF GRAY & RED PLASTIC CODES LUG TO ITS LEFT AS "IN-PHASE" TERMINAL
- RED "IN-PHASE" LEAD (PIN 2)
- SPECIAL ELASTOMER-RING SUSPENSION WITH WIRE MESH
- 3 PIN XLR CONNECTOR
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 wind-screen 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 its periphery — in effect forming a complex, high-compliance 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.

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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 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 (3.3 ft) to +7 dB typical proximity-effect boost at a working distance of 1 cm (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 high uniform cardoid 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 2% 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 cardoid 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 internal 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 (~ 1 mW / 10 dynes/cm²), the rated impedance应当 be categorized as follows: (1) for a maximum-power-level output of ~57.5 dBm (~ 1 mW / 10 dynes/cm²), the rated impedance shall be categorized as 250 ohms; (2) for an EIA sensitivity rating (Sref) of ~149.5 dBm, the rated impedance shall be categorized as 120 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 above, the microphone shell shall consist of four special modular assemblies interconnected as follows: (1) a removable shock-absorbing three-layer windscreen/pop filter; (2) a removable louvered metallic outer layer, a removable liner made up of a blast-resistant phosphor-bronze wire-mesh inner layer, and an internally threaded retaining ring to mate the transducer module with the main housing. The main housing shall protect the transducer module from metal particles, for fatigue-free handling balance and comfort under prolonged use, and for exceptional ease of field service.

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 tilt uniformly in all directions with respect to 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 damped, relatively hard body and a series of soft, progressively compressible dome-shaped projections around its periphery. These dome shapes shall effectively decouple the transducer module from mechanically and emotionally induced handling noise; (2) under extremely abusive conditions e.g., dropping the microphone or subjecting it to lateral impact), the dome shall increase in compress, in proportion to applied 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 MAXPHTM 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 specifically coded by means of a near symbolic as follows: in-line with the lug, at the rear of the module's gray and red segments, a small semicircle shall be molded into the gray segment.

The microphone herein specified shall be the AKG 0-310. An AKG model SA-31 swivel stand adapter with standard 5/B-in.-27 thread, and a foam-lined vinyl carrying case shall be provided with the microphone. The assembled microphone shall be 190 mm (7-1/2 in.) long by 45 mm (1-3/4 in.) in maximum diameter, and the net weight shall not exceed 255 g (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.

The microphone herein specified shall be the AKG D-310. The microphone shall also be available in an alternate version employing a switchable-sensitivity 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 audio output and associated circuitry whenever the switch is off. The microphone herein specified shall be the AKG D-310S.
Positive pressure on diaphragm produces positive voltage on red "in-phase" lead. See exploded view for further information on identifying transducer module's corresponding "in-phase" lug.