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MICROPHONES and ACOUSTIC DEVICES

Data Sheet

MAY 1955

SUBJECT:

MODEL "333"



STUDIO MICROPHONE

UNI-DIRECTIONAL ULTRA-CARDIOID RIBBON ELEMENT Multi-Impedance

Specifications

Response Frequency Characteristic: From 30 to 15,000 c.p.s. uniformity insured to plus or minus 2½ db. Especially designed to meet the exacting requirements of TV and radio broadcasting. Readily accessible "voice-music" switch adjusts frequency characteristic for optimum performance: ideal for adjusting frequency response for the speaker or soloist working at close range, or for the distant instruments of the orchestra.

Polar Pattern: Uni-Directional for 73% reduction of pickup of undesired sounds. Response at rear down 12 to 20 db from front. See Figure D.

1000 C.P.S. Response

Model 333 "L" Position

Open Circuit Voltage Level.....	— 87.0 db*
Power Level into 50 ohms.....	— 60.0 db**
RETMA Microphone Rating	
GM (Sensitivity).....	—153.0 db***

Model 333 "M" Position

Open Circuit Voltage Level.....	— 81.0 db*
Power Level into 150 ohms.....	— 59.0 db**
RETMA Microphone Rating	
GM (Sensitivity).....	—153.0 db***

Model 333 "H" Position

Open Circuit Voltage Level.....	— 79.0 db*
Loaded with 250 ohms.....	— 59.0 db**
RETMA Microphone Rating	
GM (Sensitivity).....	—151.0 db***

(*) 0 db = 1 Volt Per Microbar

(**) 0 db = 1 Milliwatt with 10 Microbars

(***) RETMA Standard SE-105, August 1949.

Rated Impedances: Model "333" is equipped with a multi-impedance switch furnishing a choice of three impedances—"L" (50 ohms); "M" (150 ohms); "H" (250 ohms).

Cable: 20 foot Broadcast 2-conductor shielded cable with Cannon XL-3-11 connector attached.

Shock Mount: Special vibration isolation unit of live rubber construction.

Swivel: New improved adjustable "positive action" lifetime swivel permits tilting the head 45° forward and 70° backward.



Dimensions: See Fig. C.

Finish: Combination non-reflecting Baked Bronze case with beige grill.

Stand Thread: $\frac{5}{8}$ "-27. Adapters for $\frac{1}{2}$ " pipe thread or $\frac{5}{8}$ "-24 thread available upon request at no extra charge.

Weight: Net weight $1\frac{1}{2}$ lb.; Packaged weight 4 lb.

Code Word: RUDUC.

General: The Model "333" is a slender, compact Uni-directional Microphone. An improved ribbon element (coupled with a newly designed phase-shift network) provides an Ultra-Cardioid uni-directional characteristic which gives highly satisfactory operation under adverse acoustic conditions. It permits placement of the microphone at a distance from the performer 92% greater than is possible with non-directional (omni-directional) microphones. The Model "333" reduces reverberation, reflection and pickup of undesired random sounds by 73%, thus minimizing disturbing studio noises often heard in telecasting, and radio broadcasting. The sound is received through hundreds of tiny apertures in the acoustically streamlined external grille which filters out wind, blast, and breath noises.

The extended smooth frequency response and the attending faithful reproduction is largely due to a sensitive metallic ribbon carefully suspended between the poles of the magnetic structure. The use of high efficiency magnetic materials and specially designed magnetic circuits has made it possible to develop this small microphone and still achieve maximum operating efficiency. By means of a selective switch the frequency characteristic may be adjusted to permit best results during voice or music pickup. (See "Operation"). The microphone is ruggedly built to withstand hard usage and is unaffected by temperature and humidity variations. To prevent mechanical vibration pickup, the Model "333" is provided with an isolation unit of live rubber construction. The 20 foot Broadcast-quality shielded two conductor cable is supplied with a Cannon microphone plug.

The "333" meets the most exacting requirements for maximum quality and minimum size. A new trouble-free, adjustable swivel permits tilting of the head through 45 degrees forward and 70 degrees backward making it simple to aim the microphone at the source of sound.

Applications: The Model "333" meets all requirements of broadcast, television and recording because it is controlled within close tolerances in frequency response and directivity. It is also ideal for highest quality public address, both indoors and outdoors.

The true uni-directional characteristic of Model "333" provides an easy solution to the feedback problems in reverberant locations; facilitates orchestral placement; permits best utilization of space in small broadcast studios; and provides significant reduction of unwanted noises.

Installation: The Model "333" Studio Microphone has a standard $\frac{5}{8}$ "-27 thread and may be mounted on any conventional desk, banquet, or floor stand. Adapter stand couplers are available at no charge for $\frac{1}{2}$ " pipe thread or $\frac{5}{8}$ "-24 thread. (Write Shure Brothers, Inc.) To avoid A.C. hum induction when long lines are used,

care should be taken that the cable does not parallel A.C. power lines for long distances.

Connections: The Model "333" Studio Microphone is a multi-impedance microphone. It may be connected directly to a 50 ohm line, a 150 ohm line, or a 250 ohm line. Selection of these impedances is accomplished by removing plate at the rear of the microphone and changing the position of the switch. The switch positions are marked "L" for low impedance (50 ohms), "M" for medium impedance (150 ohms) and "H" for 250 ohms.

The microphone plug is the Cannon XL-3-11 plug. The number 1 pin is connected to the microphone case and to the shield of the cable. (See Figure B.) Pins No. 2 and No. 3 are connected to the internal elements, and the microphone may be used with a balanced line. The Model "333" may be connected directly to a standard low or medium impedance input amplifier (Fig. A-1).

The low and medium impedance positions are recommended where unusually long cable lengths are required or under conditions of severe hum disturbances. For additional lengths of cable, a broadcast quality two conductor shielded cable may be used. The permissible cable length is practically unlimited, since neither response nor level is appreciably affected.

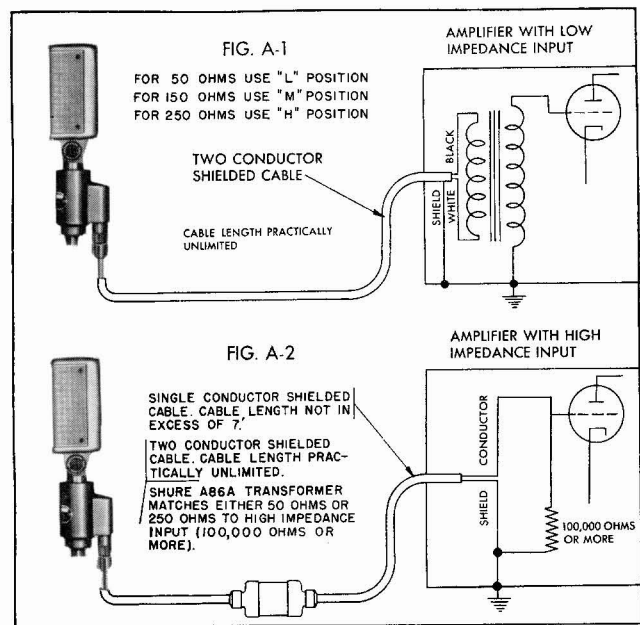


FIG. A

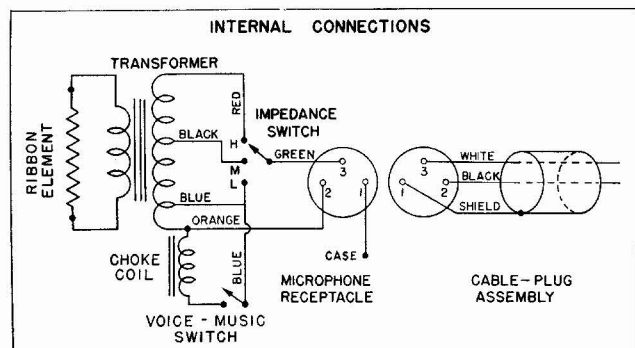


FIG. B

For use with high impedance amplifiers, Shure Model A86A Cable-Type Transformer is available for coupling the low impedance line to the amplifier input as shown in Fig. A-2. The double winding primary of the Shure Model A86A Cable-Type Transformer permits coupling either a 50 ohm line or 250 ohm line to the high impedance input.

The shield, chassis or amplifier ground should be securely connected to a water pipe or similar ground to prevent shock hazard during operation of amplifying system.

When used with amplifiers using the grid leak type of bias at the input tube, it may be desirable to use .01 mfd. condenser between the microphone and the input grid circuit.

Operation: No special precautions beyond ordinary care are necessary in the operation of Model "333" Studio Uni-directional microphone. It will operate efficiently and dependably under all ordinary conditions in hot and cold climates. To retain the full strength of the highly efficient permanent magnet and to maintain alignment of the structure, dropping or other severe mechanical shocks should be avoided.

To adjust swivel tightness, if necessary, loosen hex nut and adjust slotted swivel screw. Lock swivel screw in place by securely retightening hex nut.

The Model "333" may be adapted for either voice or music by adjusting the position of the switch located at the front of the microphone in the lower part of the stand connector. In voice position the low frequency response is attenuated by means of a high quality choke.

Caution: To prevent serious or permanent damage to the ribbon element, do not check the continuity of the microphone with a circuit tester or an ohmmeter.

Acoustic Considerations: The smooth wide-range response-frequency characteristic of the Model "333" microphone is ideal for high-quality reproduction of music and speech.

"Ultra-Cardioid" describes the horizontal polar characteristic. This polar characteristic resembles a cardioid, but is more directional. There is a wide useful pickup angle at the front of the microphone, while the rear response is down from the front response approximately 12 to 20 db. The Model "333" provides these characteristics over a broad range of frequencies. In broadcasting and recording this type of polar characteristic enables one to point the back of the microphone at unwanted noises, thus, giving interference-free pickup of desired sound. Pickup of reverberation energy is decreased approximately 73%.

In high-quality Public Address, feedback-free reproduction is assured at volume levels which would cause considerable feedback with conventional semi-directional or omni-directional microphones.

Guarantee: Each microphone is guaranteed to be free from electrical and mechanical defects for a period of one year from date of shipment from factory, provided all instructions are complied with fully. In case of damage, return the microphone to the factory for repairs. Our guarantee is voided if the microphone is subjected to accident or abuse or if the case is opened.

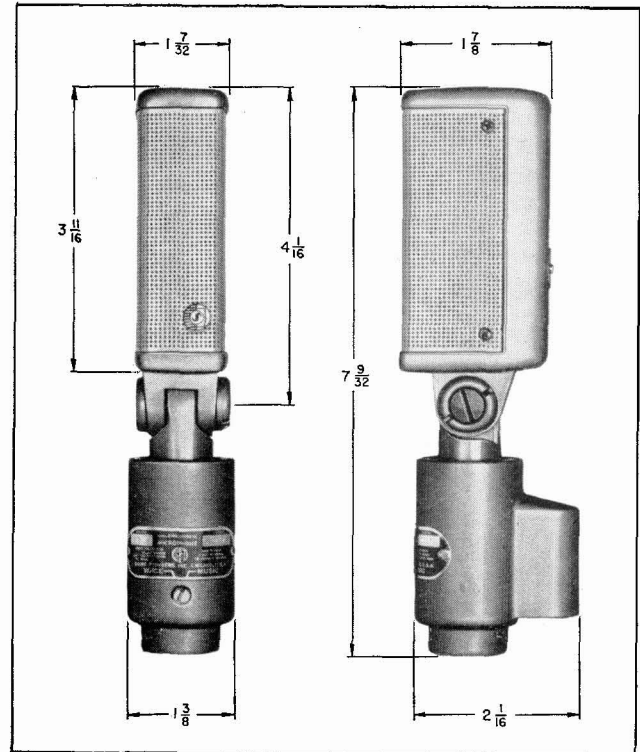


FIG. C

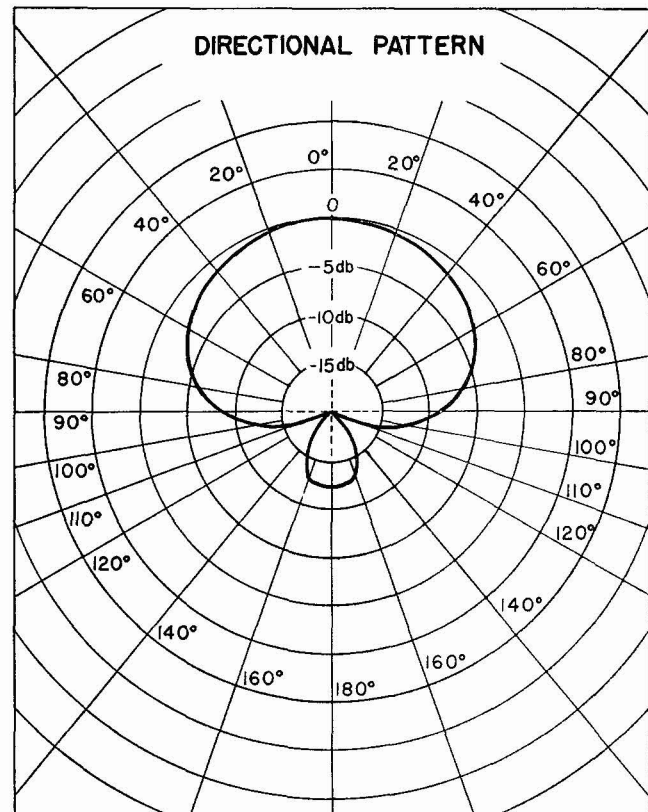


FIG. D

MODEL "333"

Architect's Specifications

The microphone shall be a moving ribbon type microphone with a frequency range of 30 to 15,000 c.p.s. This unit shall have a uni-directional horizontal polar characteristic. The cancellation at the rear shall be in the order of 15 db. The microphone shall be equipped with a three-position impedance change switch for adjusting the microphone impedance to 50 ohms, 150 ohms, or 250 ohms. The microphone rating G_M (sensitivity) at 1000 c.p.s. shall be within ± 2 db of the following levels.

"L" Position of switch.....	—153 db
"M" Position of switch.....	—153 db
"H" Position of switch.....	—151 db

RETMA Standard SE-105 August 1949.

The microphone shall be provided with a swivel adjustable from 45 degrees forward and 70 degrees backward. The microphone shall be equipped with a vibration-isolation unit in combination with the stand connector, and it shall have a detachable Cannon cable connector capable of connecting to a two-conductor shielded cable.

The microphone will mount on a stand having $\frac{5}{8}$ "-27 thread. The overall dimensions shall be $7\frac{9}{32}$ \pm $\frac{1}{4}$ inches in height, $1\frac{7}{32}$ \pm $\frac{1}{8}$ inches in width, and $1\frac{7}{8}$ \pm $\frac{1}{8}$ inches in depth.



The Mark of Quality