

**TANDBERG**

PELHAM, NEW YORK

**GRAMPIAN****DYNAMIC MICROPHONE — TYPE DP4***Uniform, Wide-Range Frequency Response***General Description**

The Grampian DP4 dynamic microphone meets the requirements of public address, wire, tape and disc recording, call systems and communication equipment. The microphone is slender and unobtrusive in appearance and will not detract attention from the user. DP4's light weight, a little under 1/2 lb., makes it ideal for the person who wishes to use it as a hand microphone.

This high output pressure type dynamic microphone has a uniform, wide range, frequency response which extends from 50 c/s to 15,000 c/s, and therefore reaches the high performance level of all Grampian equipment.

25 ohm, 600 ohm and 50,000 ohm impedance models are available.

**Adaptability**

The microphone is supplied with an easy to use holder suitable for use with floor, table or desk stands. The holder allows easy removal of the microphone, and 18 feet of lead (supplied) allows the user reasonable mobility.

A model with push button or slide switch mounted to the base is available, and provides a microphone ideally suited for call systems. A special switch assembly is also available for use with the microphone when mounted on a floor or table stand.

List Price .....\$49.50

**Specifications**

Frequency Response .....	50 c/s to 15,000 c/s.
Output levels:	
Low impedance model.....	25 ohms — 86 db below 1 volt/dyne/cm <sup>2</sup> .
Medium impedance model.....	600 ohms—70 db below 1 volt/dyne/cm <sup>2</sup> .
High impedance model.....	50,000 ohms—52 db below 1 volt/dyne/cm <sup>2</sup> .
Weight of hand microphone.....	7 <sup>3</sup> / <sub>4</sub> ozs. 219 Kg.
Length of hand microphone.....	8 <sup>1</sup> / <sub>4</sub> " 21 cm.
Diameter overall .....	1-5/16" 3 cm.
Thread on holder & swivel .....	5/8" 27 T.P.I.
	Supplied with adaptor 5/16" B.S.F.
Finish .....	Black and chrome



Grampian DP4  
Dynamic Microphone

**Grampian Cutterheads for Highest Quality Disc Recordings****Grampian Feedback Cutterhead — Type B 1/D**

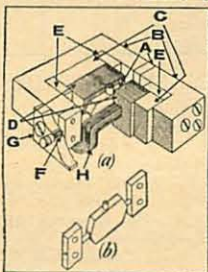
The Grampian B 1/D Feedback Cutterhead, made in London, England is an improved version of the well-known BBC system. This superb cutterhead embodies an internal feedback winding which reduces distortion, flattens frequency response, and stabilizes operation over long periods of time and widely varying environmental conditions. Because it is damped through use of silicone damping fluid (Dow-Corning 200) with a leak-proof seal, temperature and age will not affect it, thus assuring constant performance.

**Quality Construction**

The Cutter is of the iron vane, balanced armature type. Simplicity of construction makes it a rugged device; there are no springs nor balances to get out of adjustment. A cutaway view is included to show the essential parts of the head.

The ends of the armature "A" (shown separately in the cutaway view) are clamped between two U-shaped steel yokes "B", within which lie two Ticonal magnets "C" and the laminated pole-pieces "D", with their brass clamping blocks "E". The metal at the bottom of the slots at either end of the armature is shaped to form torsion bars which support the active center portion of the armature in the gap between the pole pieces.

To avoid trouble with non-axial deflections, these torsion bars are made as short as possible, consistent with reasonable stress at maximum excursion. Through the center of one of the torsion bars passes the long plain shank of the cutter clamping screw "F"; the thread is carried in an external block "G". The shank has a high torsional compliance so that the presence of the clamping screw does not add appreciably to the mechanical impedance of the armature. The coil "H" lies in the slots in the faces of the pole-pieces, and within the main winding is a second coil which connects to the cathodes of the second stage of a recording amplifier to provide negative feedback. The method of damping the mechanical resonance of the armature (around 10 KC) is to introduce a Silicone Damping Fluid into the air gaps between the armature "A" and the pole-pieces "D". Silicone is unique in that it alone has



the property of maintaining a constant viscosity over a wide temperature variation and length of service. Tests conducted with the cutter proved that the change in level covering a temperature range of 60°F. to 110°F. is no more than 1 db. Heating up of the drive coil, as well as heat transmission from a Thermo-Stylus assembly, had little or no effect. The head will fit any standard lathe and is lightweight to reduce cutter bounce (marbled effect on discs). The front plate cover is tapped to accommodate an adapter for use with heated stylus (sold as necessary) and the chuck fits standard short-shank styli.

**Technical Data**

Frequency Response—30 cycles to 15,000 ± 2 db. Down no more than 4 db at 20 cycles and 20,000 cycles.

Total RMS Harmonic Distortion—Below 1% at 1000 cycles measured at 7 cm/sec. peak recorded velocity (NARTB standard level).

Matching Impedance—16 ohms.  
D.C. Resistance—Main winding 3.7 ohms. Feedback winding 23 ohms.

Inductance—Main winding 1.65 MH.  
Turns Ratio—Main winding to Feedback winding 2:5 to 1.

\*Audio Power Required—At 1000 cycles to record 7 cm/per sec. (2<sup>5</sup>/<sub>8</sub> inches/sec.) peak recorded velocity (NARTB Standard Level)—1.26 watts or ±31 dbm.

Stability—Change in level less than 1 db from 60°F. to 110°F.

Stylus—Standard short shank 5/8 inches long.  
Damping—Dow-Corning Silicone Fluid.

Mounting—Universal mounting for all lathes.  
Cover Plate tapped for mounting Fairchild Hot Thermo-Stylus.

\*Frequency response measured with PFB-150WA Amplifier, balanced FM Modulator, and Buckman-Meyer Light Pattern.

LIST PRICE of Type B 1/D  
Feedback Cutterhead .....\$350.00

**Grampian Feedback Cutter System**

The Grampian B 1/D cutterhead is incorporated in the Grampian Feedback Recording System which produces the highest quality disc recordings known to date. Complete in every detail of equalization, pre-emphasis, and level correction for all three speeds, this unique system comes ready for instant mounting, turn-on, and operation without the necessity of recalibration, experimentation, etc. To operate the system requires only the sound source on one end and the lathe on the other. Write for more information.

LIST PRICE Complete System.....\$1,265.00

**Grampian Magnetic Cutterhead — Type C (Non-feedback)**

Grampian Type C cutterheads are a development from our feedback cutterhead and have similar mechanical and electrical constants but are operated from a single winding. They may be used in conjunction with any high grade power amplifier.

**Quality Construction**

The cutterheads are of the balanced armature type, the resonant frequency of the armature being about 9 Kc. This high resonance is achieved by using an armature of pivotless design, the usual pivots being replaced by hollow torsion bars. Since the resonance is so high, the frequency response is fairly flat between 500 c/s to 4,000 c/s, thus making the sensitivity independent of acetate loading, especially when using "hot" stylus technique. The main resonance of the system is damped by the use of Silicone fluid. Contrary to rubber or plastic damping materials, Silicone fluid remains virtually unaffected by changes of temperature.

The price paid for the advantages of the high resonance condition is the increase in the stiffness of the system thus requiring more power to drive it. However, present day techniques make it relatively simple to achieve high power outputs from audio amplifiers with low distortion, and it is recommended that the cutterhead be used in conjunction with an amplifier capable of providing at least 25W output at low distortion.

While normal recording levels may be obtained with an input of 6 watts approx., a much higher peak power is required to deal with transient sounds and the rising frequency response necessary with present day recording characteristics.

An average peak level of 7 volts is required for normal 78 r.p.m. recordings and 3-4 volts for L.P. recordings. Grampian non-feedback cutterheads are available for vertical or horizontal mounting.

**TECHNICAL DATA**

SENSITIVITY—3 volts input for 1 cm/sec. at 78 R.P.M.	
IMPEDANCE—15 ohms at 1000 c/s.	
FREQUENCY RESPONSE—± 3 db — 50 c/s to 10 Kc. — 6 db at 20 Kc.	
DISTORTION—2% at 1000 c/s.	
WEIGHT—6 <sup>1</sup> / <sub>2</sub> ozs.	
STYLUS HOLE—0.064" or 0.625" as required.	
LIST PRICE .....	\$225.00