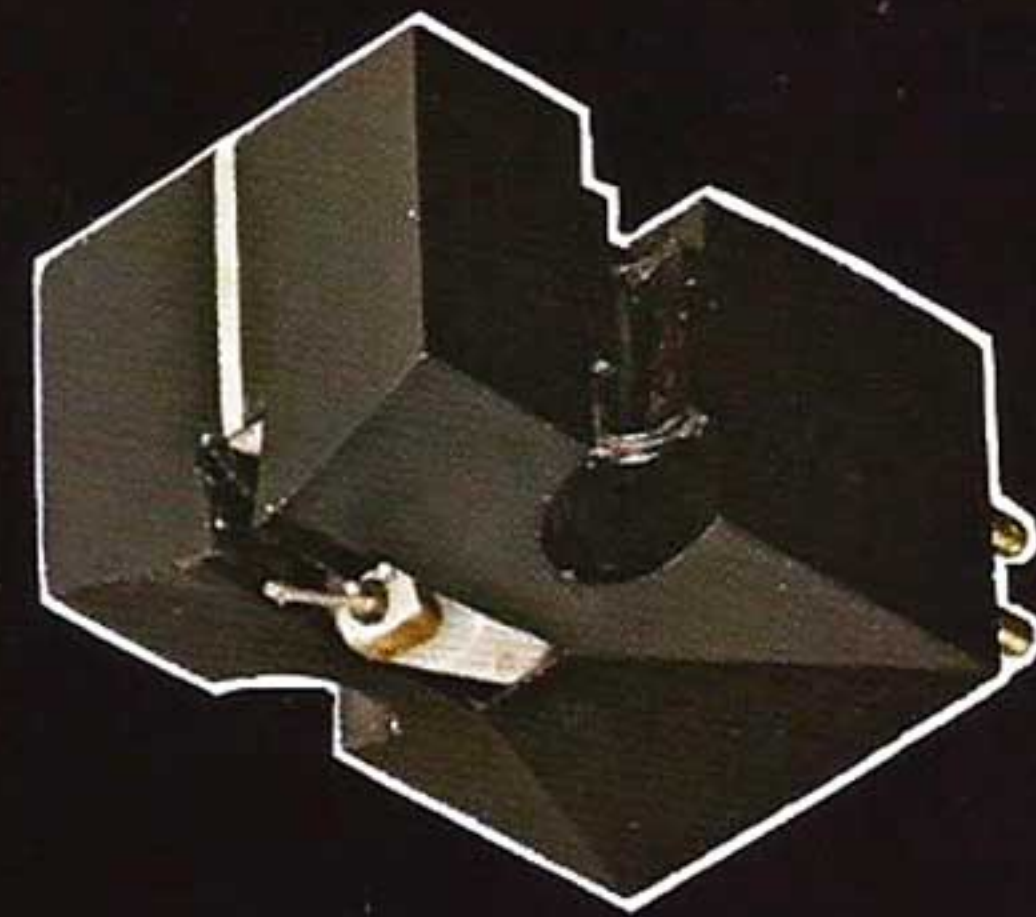
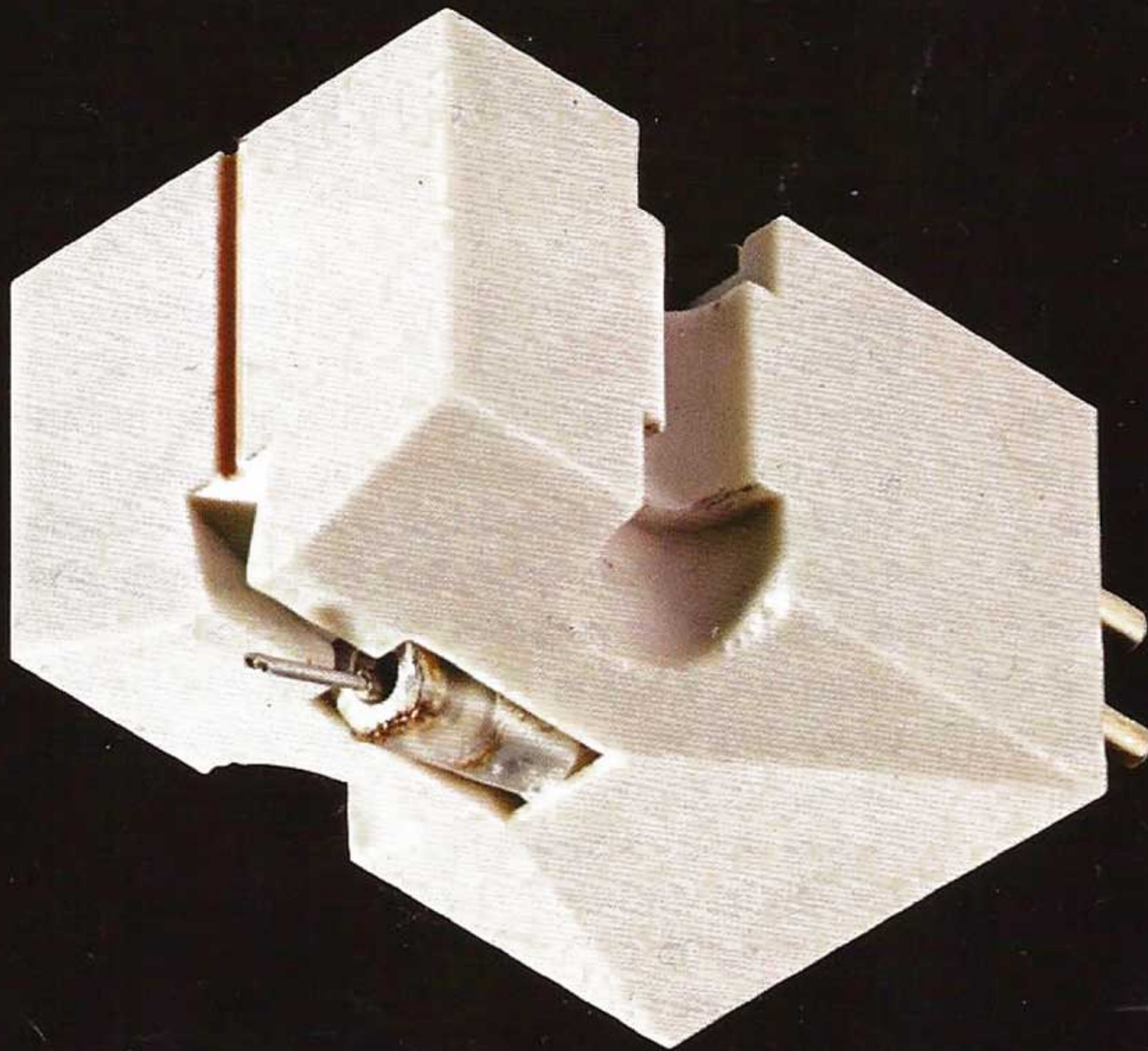


DENON

PHONO CARTRIDGE & ACCESSORY

DL-103 · DL-103S



DENON

DENON has been successfully engaged in the manufacture of moving-coil type cartridges since 1950. DL-103 was developed to meet the requirements of broadcasting stations and employed by them in 1965 after passing the rigorous tests and comparisons of cartridges of foreign and domestic makes. Thereafter, it enjoys a high reputation among broadcasting stations and general users for long years as a really standard model of high-grade stereo cartridges with excellent quality. Today, it is extensively used as standard cartridge also for the tonal quality monitoring of original record discs at record making companies and for the test of acoustic apparatuses in other fields.

The know-how accumulated in developing DL-103 has been applied to DENON series of cartridges developed thereafter. Particularly noteworthy among them is DL-103S. The moving-coil type cartridge based on DL-103 features a high performance raised up to more than 60KHz ultra audio area. This has been realized by increasing the compliance, while employing the vibration system of DL-103 reduced in weight, and thereby developing a high tracking ability. Therefore, it exerts a high performance in the reproduction of any 4-channel as well as 2-channel record disc.

We are confident that DL-103S as new standard cartridge will open a new era of stereo record discs.

Fundamental Structures of DL-103 and DL-103S

The fundamental structure of DL-103S is same as that of DL-103. Figs. 1 and 2 are generated diagram and a vibration system structural diagram. As shown in these diagrams, DL-103 employs such a one-point supporting system that the cantilever is supported by fine steel wire and, therefore, prevented from causing longitudinal detrimental vibration. The stylus tip, on the other hand, has an equal compliance (softness) so as to vibrate freely in any direction of including the vertical and lateral. Further, the cartridge has such a structure that the center point of vibration may not be moved even if the stylus tip sinks due to increase the tracking force. Further, the equivalent mass of the vibration system is extremely small thanks to the combination of DENON peculiar cross-shaped armature, cantilever and diamond stylus tip which are all light in weight. Small sensitivity difference, good separation and uniform frequency characteristic between the right and left channels have been obtained by winding generating coil round the cross-shaped armature independently.

Rational Vibration System and Low-Distortion Generator

Fig. 1 shows its generated principle. Magnetic force line passes through the armatures put at a right angle to parallel direct-current magnetic fields, causing magnetic flux. The armature moves in accordance with the movement of the stylus tip connected therewith by the cantilever. The density and the direction of the magnetic flux are varied thereby, generating in the coil the output voltage corresponding to the right and left channels respectively. The center of vibration is not moved even if the inclination of the armature is varied by the stylus tip sinking due to increase the tracking force. Therefore, any dynamical unbalance will not occur in the mechanism of generation.

Thus, the output voltage is stable and the distortion does not increase for variation of the tracking force.

Ultra Wide Range Reproduction and Excellent Tracking Ability

It is thanks to the structure of the vibration system including the cantilever that DL-103 can perform flat reproduction up to about 45kHz (the characteristic diagram shows its reproduction range up to only 20kHz because the used test record disc has no further performance) far exceeding the audible highest frequency of 20kHz.

Fig. 3 shows the vibration system of DL-103 and DL-103S. The

cantilever is required to conduct the movement of the stylus tip faithfully to the armature and it is generally made of pipe because of its light weight. When not sufficient in rigidity, the pipe is unable to conduct the movement of the stylus tip faithfully to the armature, causing the hang down of the frequency characteristic, due to its liability to deflection in the medium or high frequency range. Various models of DENON cartridge including DL-103 employs a unique "jointed rod type" double layer structure cantilever to realize a high rigidity and to reduce the equivalent mass simultaneously.

Thanks to such structures of magnetic circuitry and vibration system, DL-103 exerts excellent reproduction performance over a wide range up to more than 40kHz exceeding the audible range, with extremely small distortion and good separation and balance between the right and left channels.

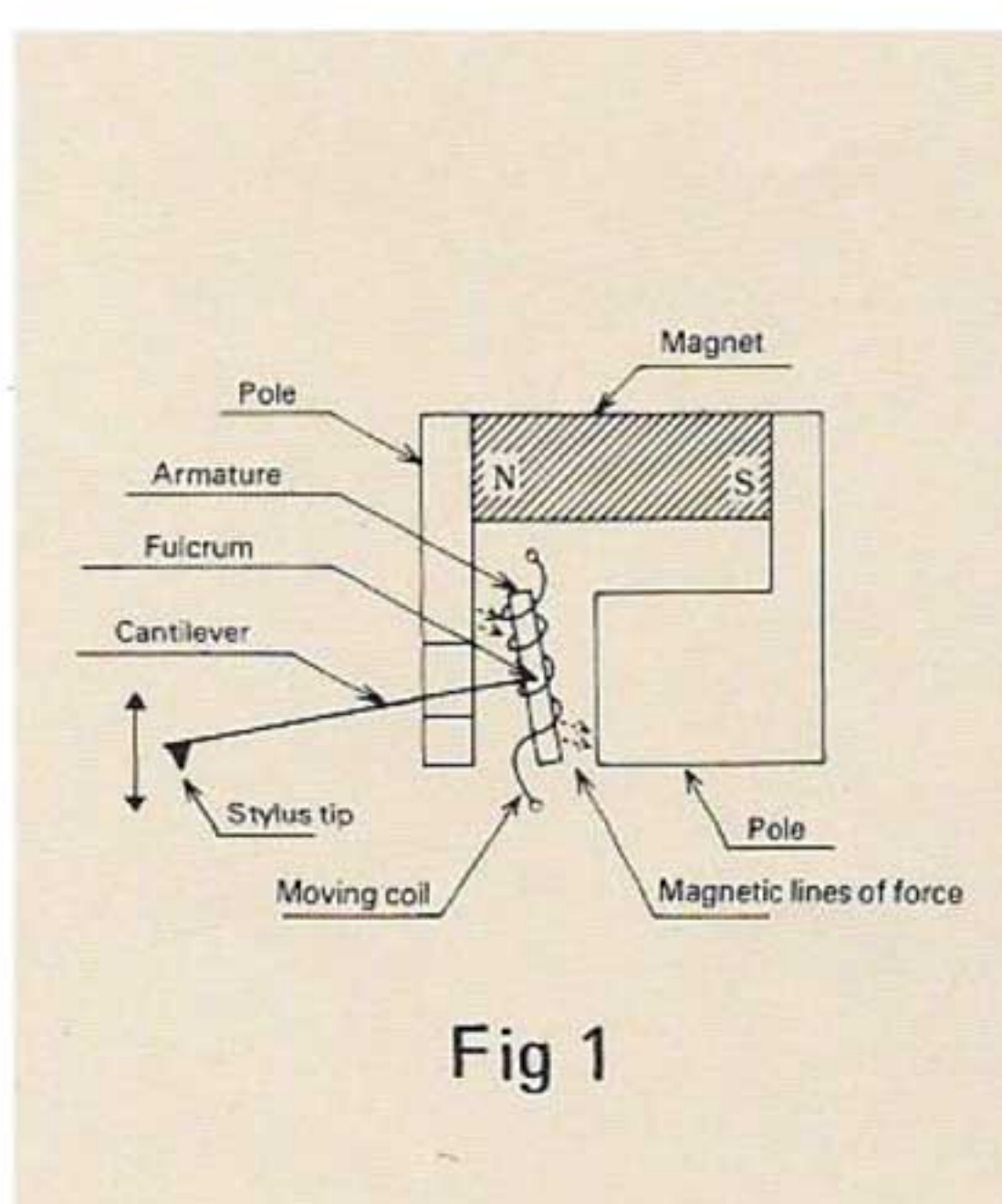


Fig 1

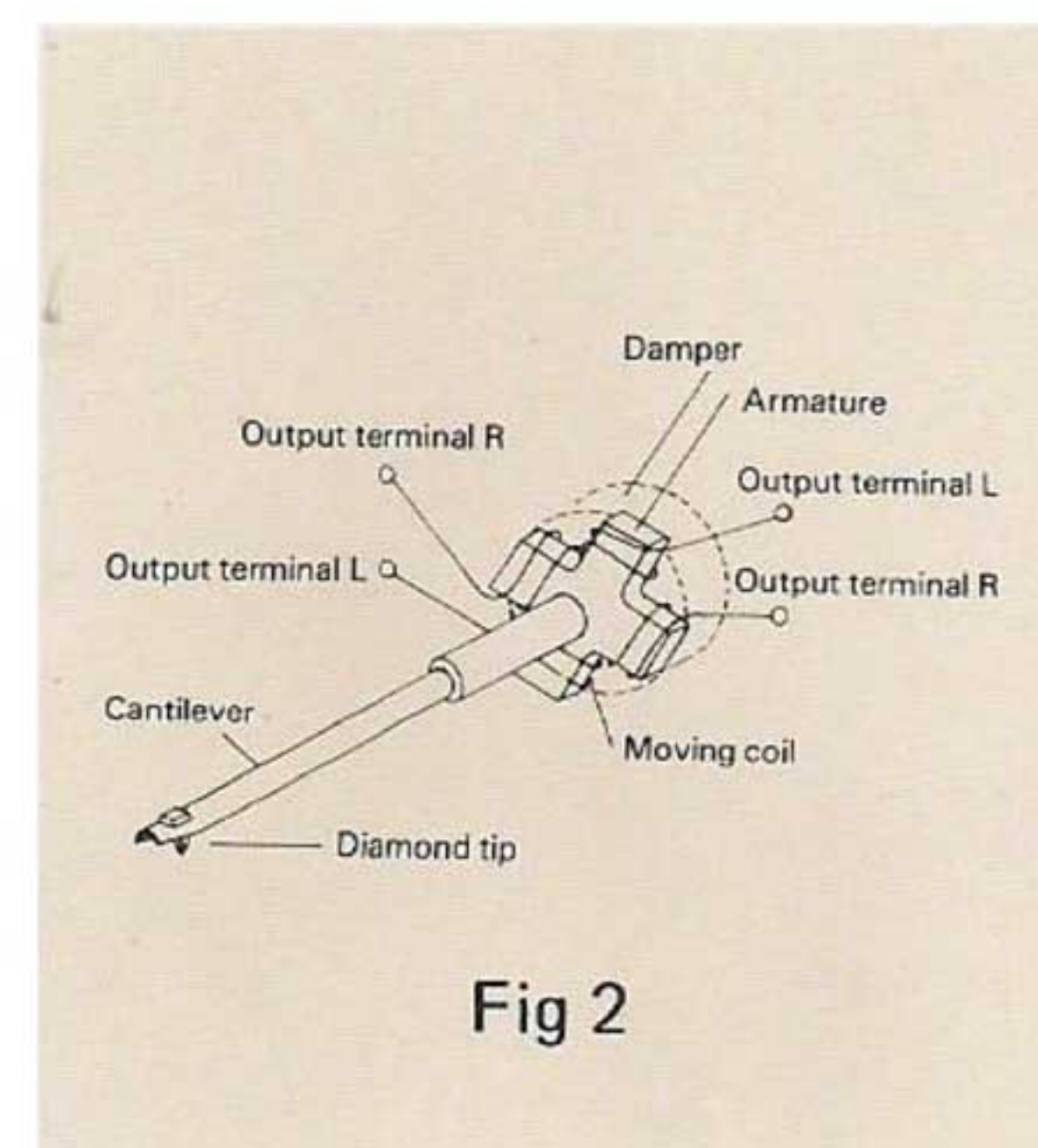


Fig 2

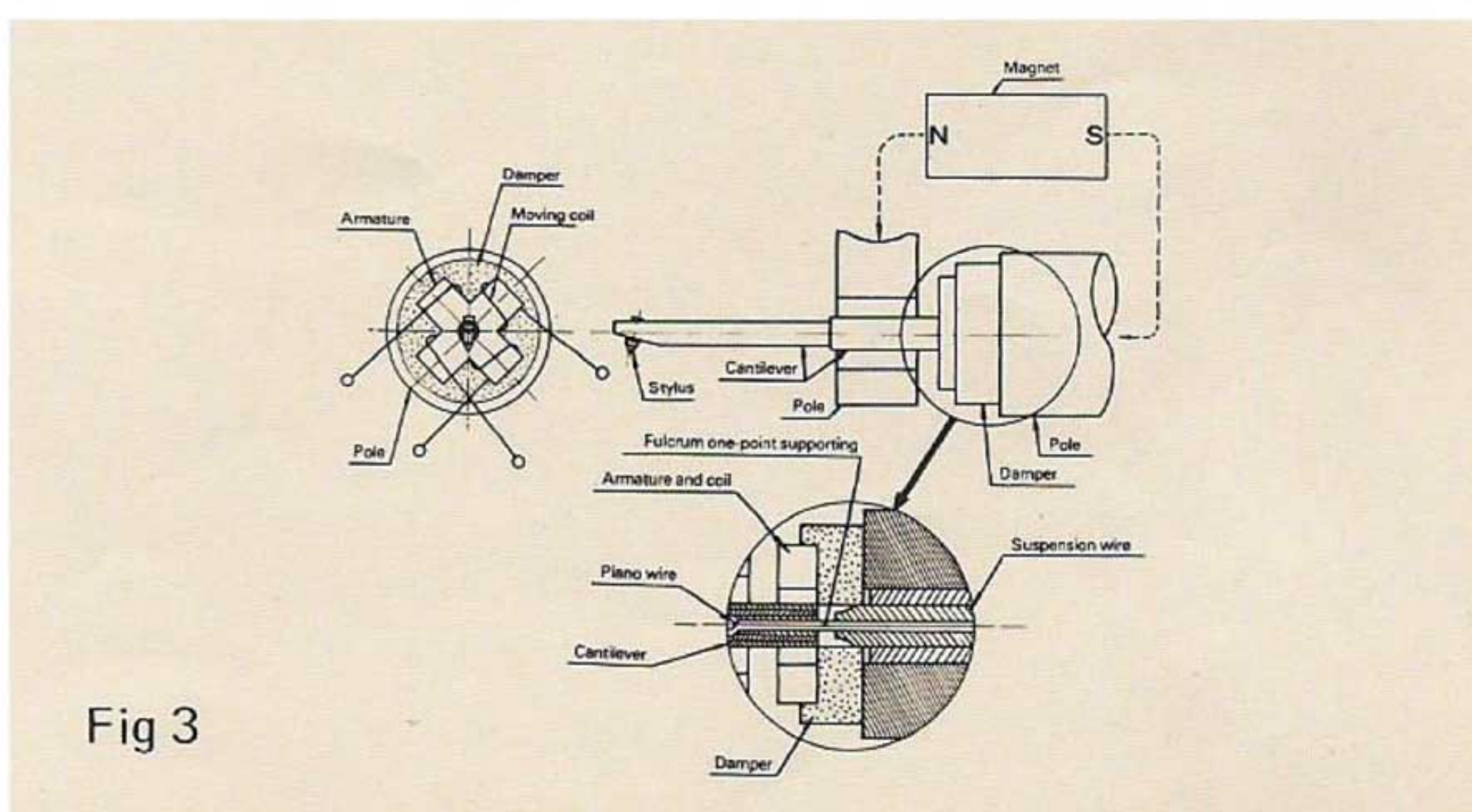
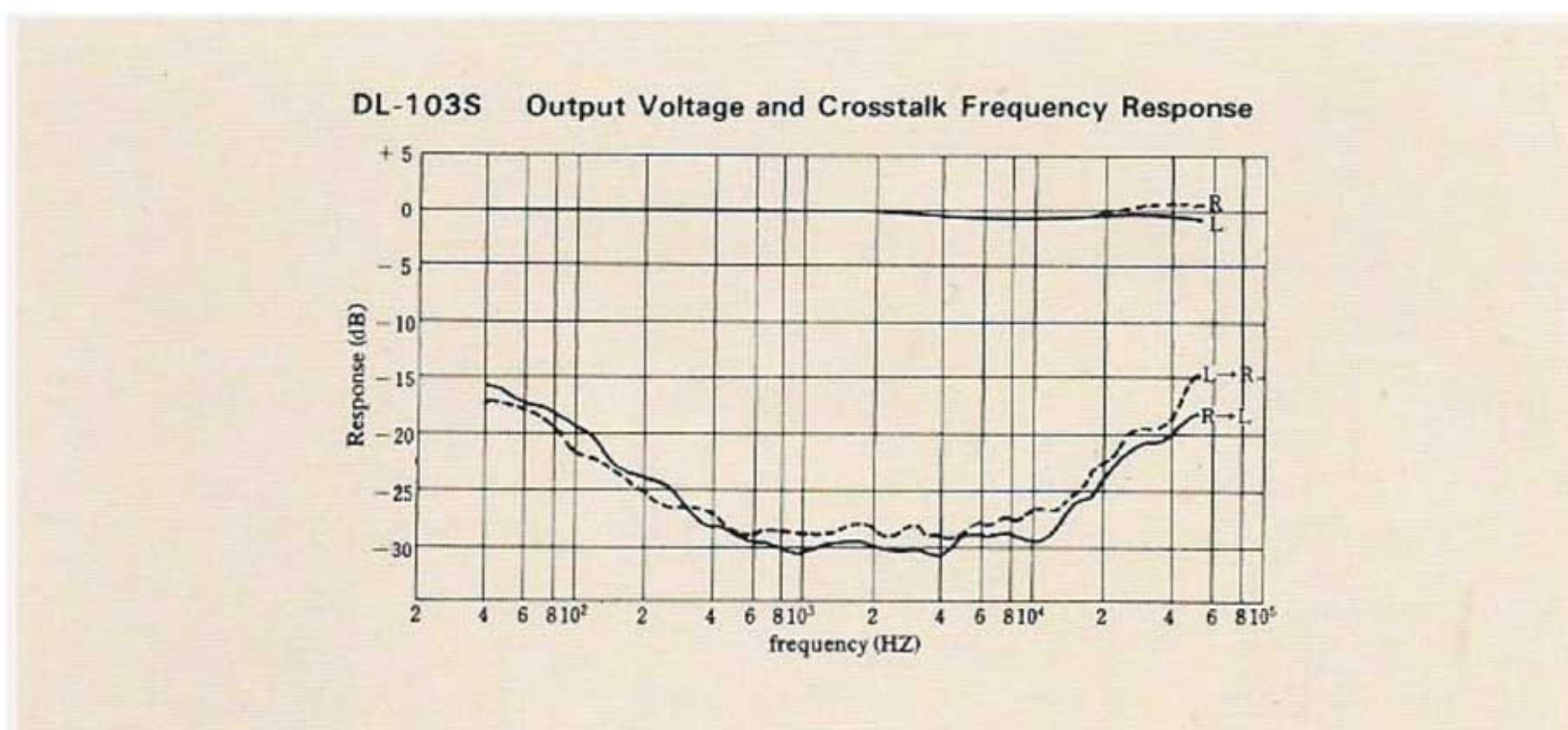


Fig 3

Long-Life Solid Diamond Stylus Tip

The solid diamond stylus with a curvature radius of 0.65 mill = 16.5 microns is mounted on the cantilever by a special method using a small quantity of binding agent. This largely contributes to lighten the weight of the vibration system. Further, its mounting angle is such that the hardest side of the diamond crystallographic axis get in contact with the sound groove of the record disc in playback. Thus, it is durable for long time use.



DL-103S was given its birth upon the opportunity of announcing the discrete 4-channel type "UD-4" of our originality in 1973. Based on the structure of DL-103, the moving coil type cartridge has same features in principle such as one point supporting type vibration system. High tracking ability has been achieved with light tracking force by increasing the compliance and the lighter weight of the vibration system than that of DL-103. Its performance has been developed up to the ultra audio range of more than 60kHz. Therefore, it exerts high performance in the reproduction of all kinds of 4-channel record discs as well as 2-channel record discs.

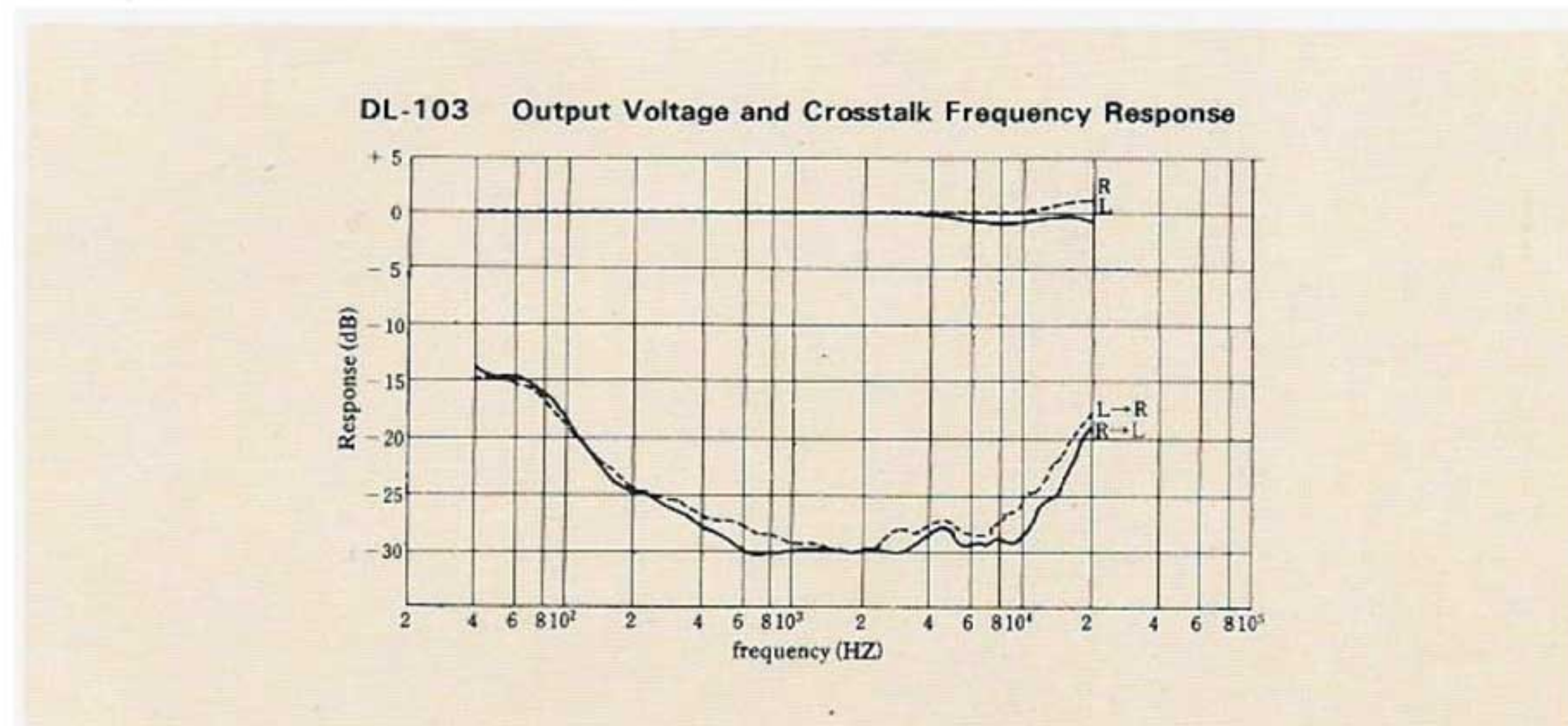
Its excellent performances include exceptionally small loss at high frequency within the audible frequency region. Thus, it is also aimed at contributing to the improvement of record cutting technique as a new standard cartridge.

Same as DL-103 in Fundamental Structure and Convenient Interchangeability with DL-103

Its generation principle, vibration system structure, outside dimensions, output voltage and electric impedance are all same as those of DL-103. Its differences from DL-103 are that its reproduction frequency range is wider, the color or its case is ivory and its weight is lighter by 0.7gr. Its proper tracking force has been reduced by 0.7gr. from that of DL-103 thanks to its high compliance. It can be interchanged with DL-103 without any readjustment of the tracking force using the same type of head shell.

Eminent Reproduction is Enabled up to 60kHz since High Resonance Frequency of Vibration System

The double layer structure cantilever of DENON originality allows substantially free variation of its high-frequency characteristic by changing the combination of the lengths of the outer and inner tubes. Further, control of its characteristics can be made by changing the material and the surface treatment of the pipes. The cantilever of DL-103S uses a special light alloy and employs a lighter and proper combination of the lengths. Further, its diamond stylus tip most influential on the mechanical impedance for high frequency, i.e. the equivalent mass of the vibration system, has been made smaller and lighter. Its high



compliance is achieved by reducing the tension of the steel wire of the unique one-point supporting system and changing the material of the damper. Thanks to the reduction of the mechanical impedance, it shows an excellent sound groove tracking ability even for the fine carrier signals of discrete 4-channel record discs as well as large audio signals without causing any stylus jump.

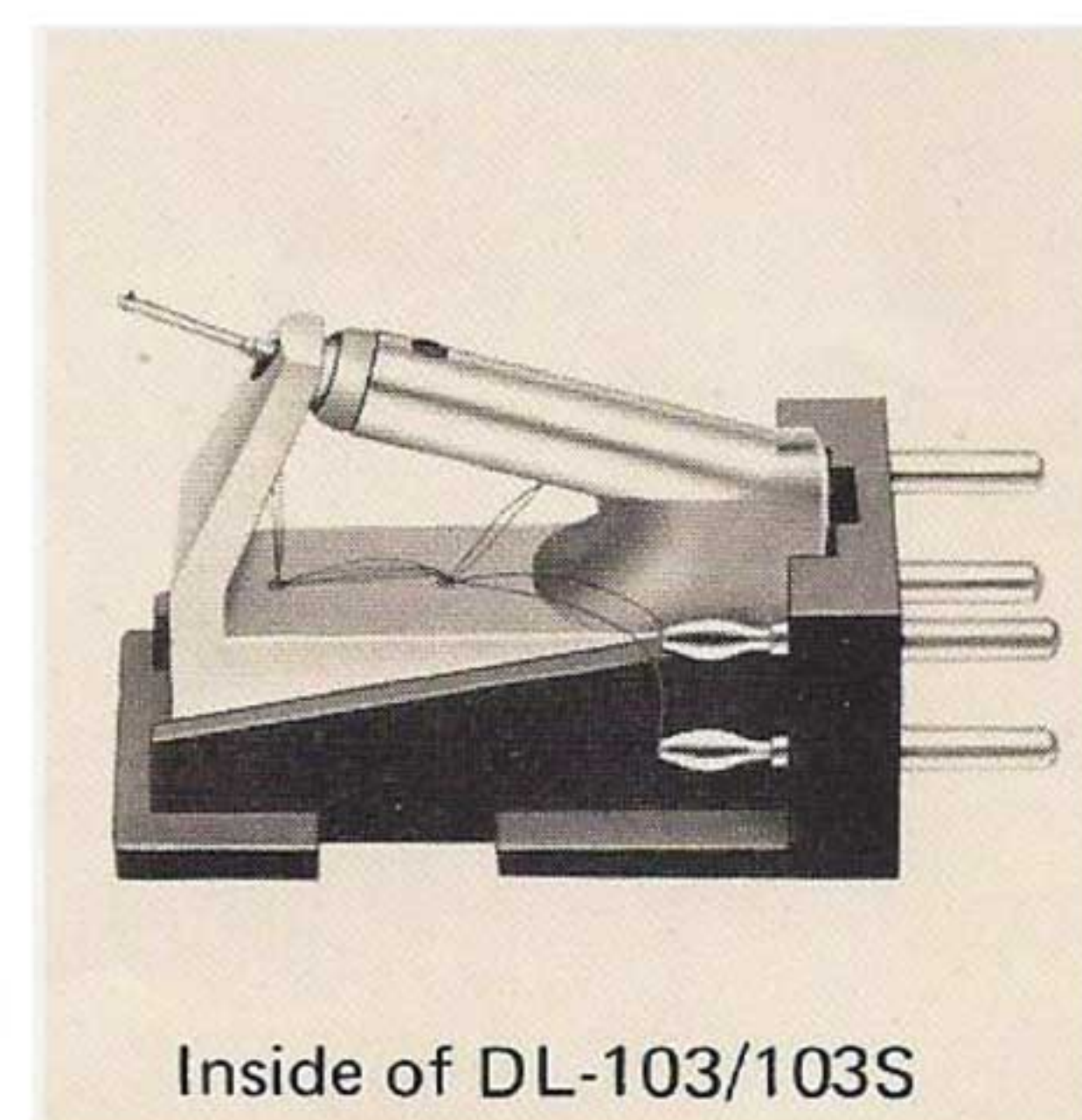
Separation is Improved by Employment of Long-Life and Low Distortion Special Elliptic Stylus

The diamond tip of DL-103S has a special elliptic shape for line-contacting similar to that of a record cutter stylus while that of DL-103 is round. Therefore, distortion and loss caused by the difference of shape between the record cutting stylus and the reproduction stylus are extremely small up to a high range thanks to the effect of the shape combined with the light weight and the high tracking ability. Thus, excellent reproduction can be enjoyed without any fear of damaging the record disc.

Excellent channel separation is obtained over the whole range since the stylus tip somewhat smaller (than that of DL-103) has been skillfully mounted on the cantilever so that the dynamic balance around the axis connecting the supporting point of the vibration system and the stylus tip may be best. It attains 23~24dB even around 20kHz.

Thanks to the above described performance, it presents clear distinction (separation) and positioning (stereo effect) of various instrument sounds without any turbidity in reproducing the sound of instruments having many harmonic components and treble sound instruments.

This cartridge has so wide a frequency range that the high frequency surface noise on a record disc may be reproduced in discrete 4-channel record reproduction of which the reproducibility is required to cover up to 45kHz. Therefore, it is to use the pickup filter exclusively used for the elimination of such noise.



SPECIFICATIONS

DL-103

Type:	Moving coil
Output voltage:	0.3 mV (1 kHz 50 mm/sec)
Frequency response:	20~45,000 Hz
Output impedance:	40Ω (1 kHz)
Load impedance:	More than 100Ω
Channels separation:	Over 25dB (1 kHz)
Channel sensitivity difference:	1 dB or less (1 kHz)
Stylus tip:	0.65 mil round stylus
Sylus pressure:	2.5 ± 0.3 gr
Compliance:	5 × 10 ⁻⁶ cm/dyne
Weight:	8.5 gr

DL-103S

Type:	Moving coil
Output voltage:	0.3 mV (1 kHz 50 mm/sec)
Frequency response:	20~60,000 Hz
Output impedance:	40Ω (1 kHz)
Load impedance:	More than 100Ω
Channels separation:	Over 25 dB (1 kHz)
Channel sensitivity difference:	1 dB or less (1 kHz)
Stylus tip:	Special elliptical tip stylus
Stylus pressure:	1.8 ± 0.3 gr
Compliance:	8 × 10 ⁻⁶ cm/dyne
Weight:	7.8 gr

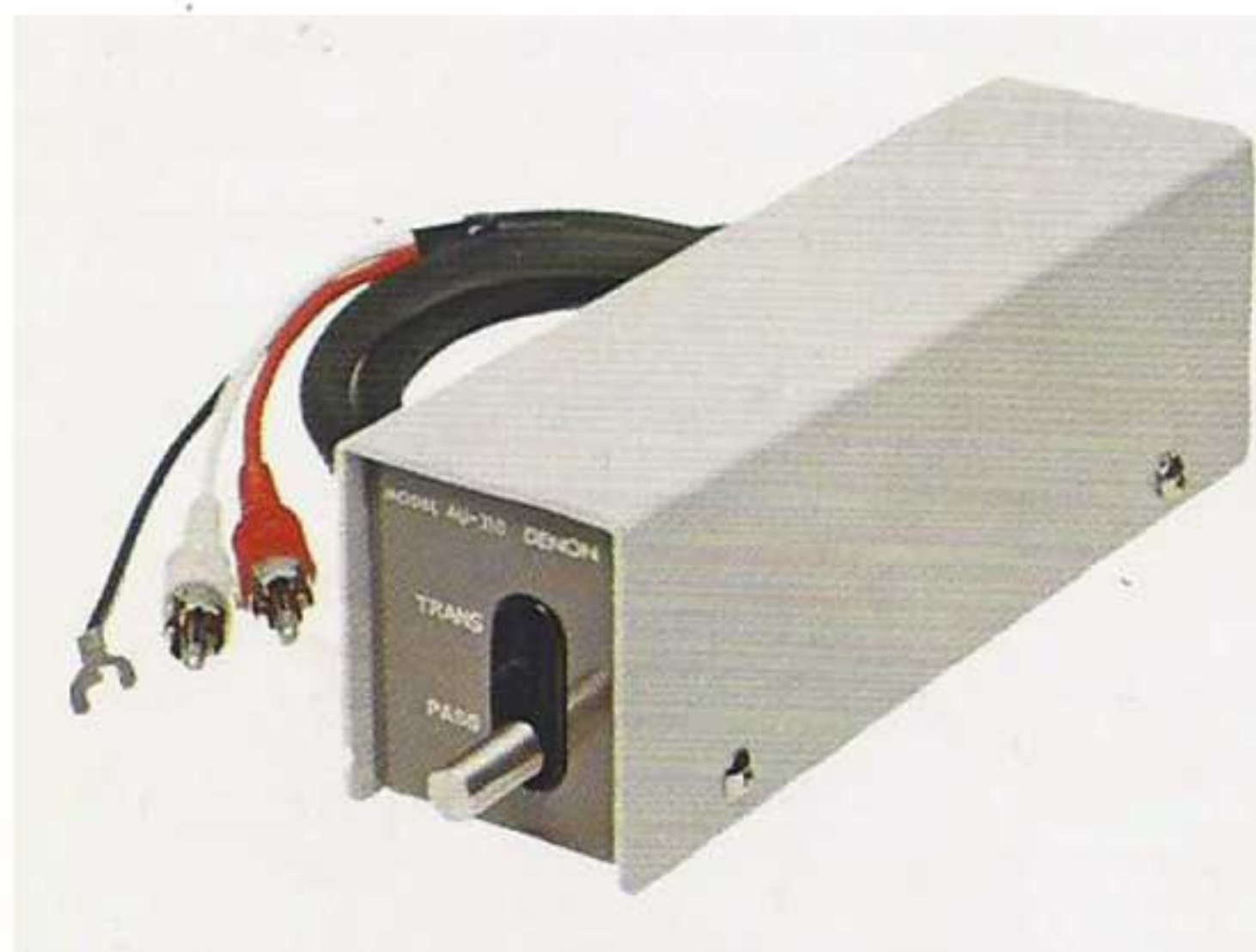
MC-type cartridges generate hardly high output voltage because of their mechanism. Therefore, it is recommendable to use the DENON cartridge transformer with excellent characteristics in order to maintain sufficient S/N ratio of an MC-type cartridge.

Universal MC-type Cartridge Transformer AU-320

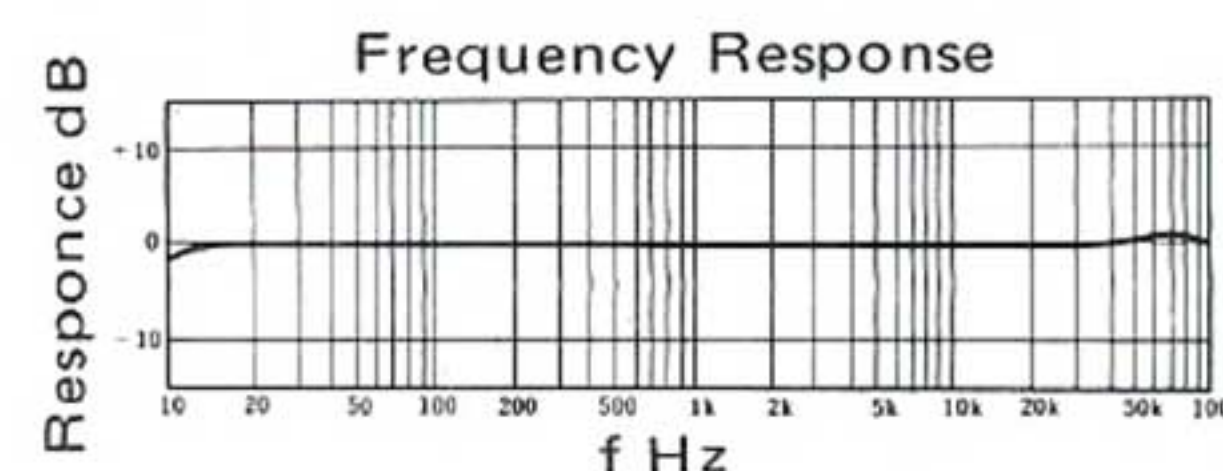


Change-over between two cartridges and among two different impedances and "PASS" can be made by handling front switches. A high S/N ratio is achieved by its triple shielding. Its high performance is secured by the low-capacitance output cord and the gold-plating terminals free from the increase of contact resistance through long years' use. All these have made it possible for the universal type cartridge transformer to ensure full performance of various kinds of MC-type cartridges on the market as well as DL-103 and DL-103S. Thanks to its flat wide band characteristic and excellent phase characteristic, it can sufficiently afford even to reproduce discrete 4-channel record discs.

Universal MC-type Cartridge Transformer AU-310

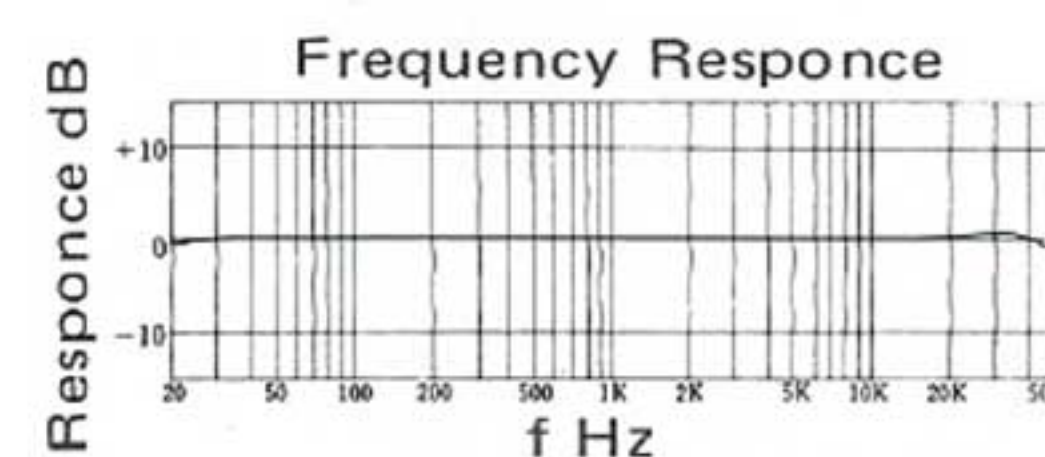


With a "PASS" position. Selection is possible between transformer passing and non-passing (PASS) circuits by handling the front switch. This is very convenient when MC-type and MM-type cartridges are mounted alternately on a single tone arm. A compact high-performance transformer with a high S/N ratio ensured by double shielding and a low-capacitance output cord. Use AU-310 for 2-channel stereo reproduction with DL-103 or DL-103S.



SPECIFICATIONS

Step-up ratio:	1:10 (at 40Ω: 4 kΩ)
Primary impedance:	3Ω, 40Ω
Secondary impedance:	4 kΩ
Frequency response:	10 Hz~100 kHz (±1 dB)
Phase characteristic:	20 Hz~50 kHz (10° or less)
Dimensions:	97 mm(W) x 65 mm(H) x 155 mm(D)
Weight:	800 gr



SPECIFICATIONS

Step-up ratio:	1:10
Primary Impedance:	40Ω
Secondary impedance:	4 kΩ
Frequency response:	20 Hz~40 kHz (±1 dB)
Load impedance:	50 kΩ or more
Dimensions:	51 mm(W) x 53 mm(H) x 181 mm(D)
Weight:	650 gr