

# PL-90

Quartz-PLL Direct-Drive Turntable



The PL-90 is made for the purist. Its features are basic — just those needed to improve sound. In essence, the player is designed to extract all the musical information embodied in the microscopic grooves of your records. There are some good reasons why the PL-90 makes this possible. One is a tone arm made from alumina ceramics; another is the Pioneer DRA (Dynamic Resonance Absorber). Alumina combines high rigidity and lightness, which makes it a material ideal for the tone arm. But it lacks internal loss; alone it would make the arm prone to resonance, coloring reproduced sound and causing cartridge mistracking. Therefore, we've developed the DRA and fitted it on an alumina tone arm to effectively increase internal loss. The DRA, in a word, is a complex resonator that cancels out modes of resonance in the tone arm. The combination of the alumina tone arm and the Pioneer DRA lets the cartridge pick up only music from records with accuracy and precision. The result is clean, natural, and well-defined analog sound — the kind you'd like to hear over and over.



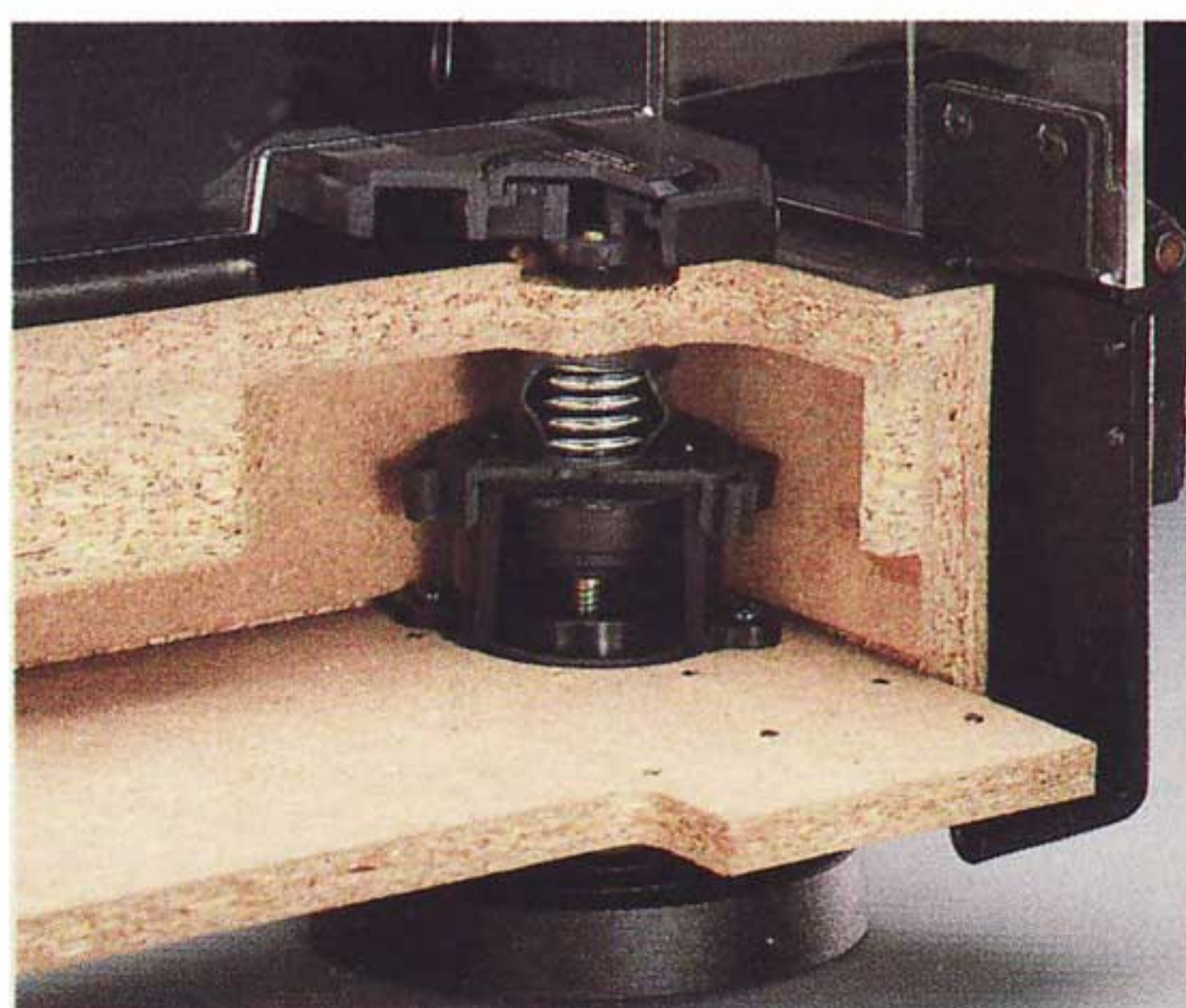
## REFERENCE QUARTZ-PLL DIRECT-DRIVE TURNTABLE

### PL-90

Think of it as the most advanced form in turntable technology. The PL-90 is designed to let you enjoy the maximum dynamic range and low distortion that today's best analog recordings can deliver.

To get the best performance out of today's sophisticated phono cartridges, we've fashioned its straight tone arm out of light yet rigid alumina-ceramics. Then we've fitted on it a Pioneer DRA (Dynamic Resonance Absorber), a combination of a viscous damper and weight, to eliminate resonance.

To ensure that your records are played with extremely low noise and wow and flutter, we use a coreless direct-drive DC-servo motor controlled



by a precise quartz-PLL servo system to provide cog-free and ripple-free smooth torque generation. The motor is fitted with a Stable Hanging Rotor to improve stability. The platter is large (14-3/16 inches across), heavy (7 lbs. 4 oz.) and has a high moment of inertia (655 kilograms per square centimeter), to smooth out rotation.

The important tone arm and motor are fully insulated from external influences through a Double Insulation System that shuts out vibration in both horizontal and vertical planes. The cabinet is made of high-density material to suppress resonance.

Ease of use is enhanced with the addition of automatic arm lift-up at the end of record play.

# Reference Quartz-PLL Direct-Drive Turntable

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The PL-90 is equipped with the most up-to-date features in turntable technology. It's designed to let you enjoy the maximum dynamic range and low distortion that today's best analog recordings can deliver.

One of the first things you'll notice about this turntable is its tone arm. To allow you to get the best performance out of today's sophisticated phono cartridges, we've fashioned the straight tone arm out of light yet rigid alumina-ceramics. Then we've fitted it with a Pioneer DRA (Dynamic Resonance Absorber), a combination of a viscous damper and weight, to eliminate resonance. Mechanically strong and dynamically stable, our tone arm improves the response over a wide range, adds crispness and transparency to the sound and delivers a sharply defined sonic image.

The turntable motor is also a highlight of the PL-90. To ensure that your records are played with extremely low noise and wow and flutter, we use a coreless direct-drive DC-servo motor controlled by a precise quartz-PLL servo system to provide cog-free and ripple-free smooth torque generation. The motor is coupled with our exclusive Stable Hanging Rotor. With conventional designs, the fulcrum of the rotor is placed at the bottom of the motor, which puts an added load on the bearing. With our new rotor design, however, the fulcrum is located just below the platter where it coincides with the center of gravity of the platter. This lessens the load on the bearing and dramatically improves platter stability.

The platter is large (14-3/16 inches across), heavy (7 lbs. 4 oz.) and has a high moment of inertia (655 kilograms per square centimeter). Therefore, once set in motion, the platter exhibits constant rotation, thus contributing to clear and transient reproduction.

Our anti-resonance and vibration concept is evident throughout the PL-90. The critical tone arm and motor are fully insulated from external influences through a Double Insulation System that shuts out vibration. Thanks to a low-center-of-gravity cabinet and lateral dampers, vibrations in both horizontal and vertical planes are fully damped: shocks, sound pressure from speakers, and minute vibrations set up by counteraction of the motor, are all rendered harmless. Further, a solid die-cast arm base and support isolate the tone arm from the cabinet, which is made of high-density particle-board to suppress resonance.

Despite its elaborate construction, the PL-90 is simple to use. When play is over, the tone arm automatically lifts itself up and the motor eases to a stop.

Finished to a refined lacquer-like shine, the PL-90 is a worthy addition to any sound system.



## Reference Turntable

### PL-90

#### Reference Quartz-PLL Direct-Drive Turntable



- Light, straight tone arm of rigid alumina-ceramics for improved response
- Pioneer-exclusive Dynamic Resonance Absorber (DRA) uses a viscous damper and weight to eliminate resonance
- Coreless direct-drive DC-servo motor for low noise and wow and flutter
- Quartz-PLL servo system for stable and accurate motor-speed control
- Pioneer-exclusive Stable Hanging Rotor for improved stability of the rotating motor
- Stable platter rotation thanks to a high moment of inertia ( $655 \text{ kg/cm}^2$ ) of a large (14-3/16") and heavy (7.25 lbs.) platter
- Double Insulation System to shut out external vibrations
- Low-center-of-gravity design with lateral dampers to damp vibrations in horizontal or vertical planes
- Tone arm is isolated from the cabinet by a solid diecast arm base and support to shut out interference
- Cabinet is made of high-density particleboard to suppress resonance

# Stable Hanging Rotor is a trademark of Pioneer Electronic Corporation.

## Glossary

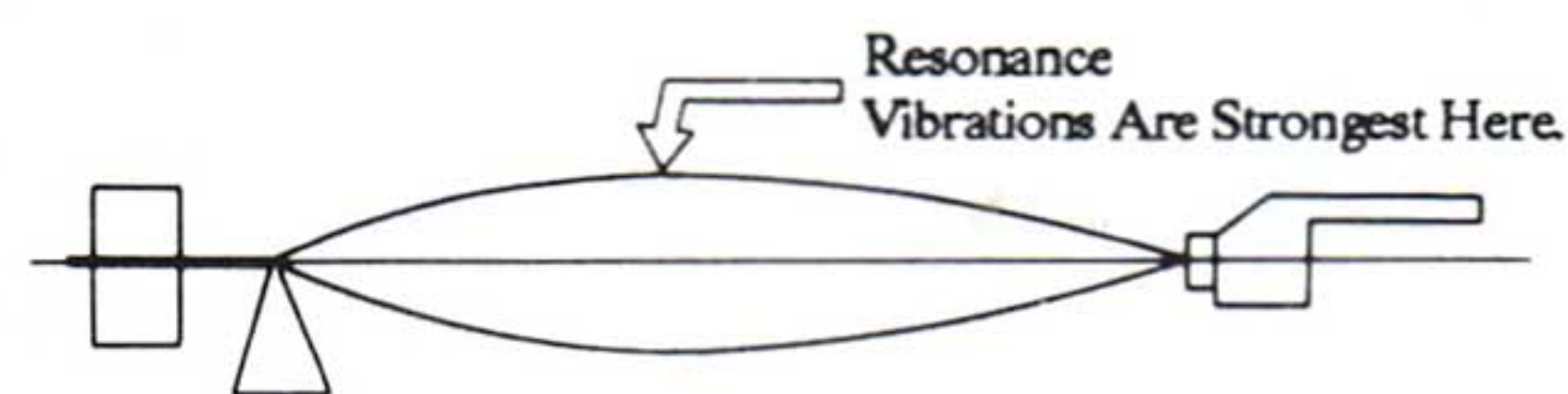
### DRA (Dynamic Resonance Absorber)

When unwanted resonance is present, no tone arm can perform its job-which is to permit the cartridge stylus to trace the grooves in the record faithfully.

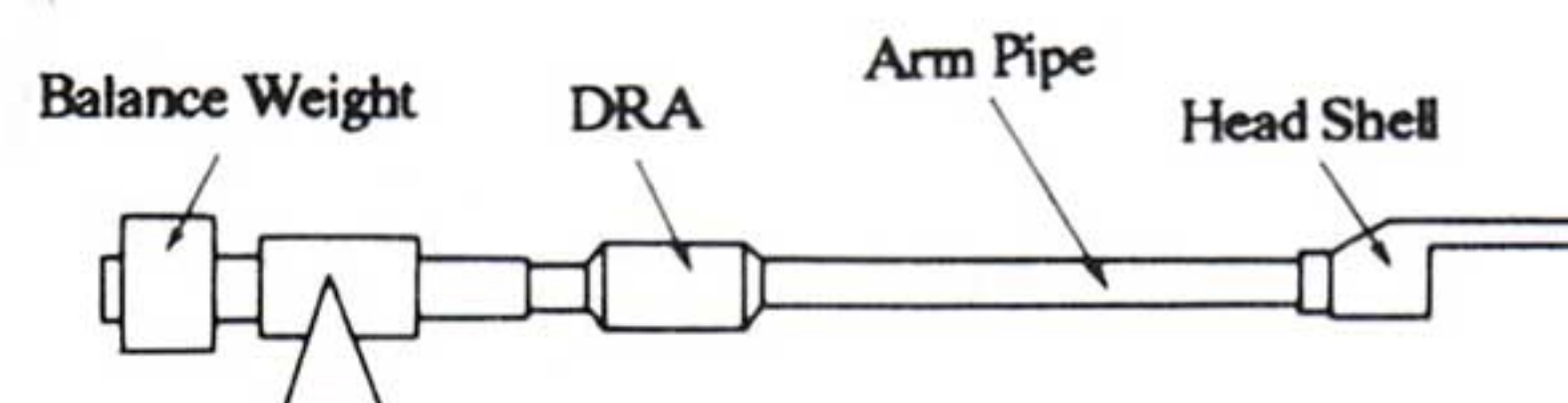
Pioneer engineers made thorough computer analyses of tone-arm vibration characteristics in order to perfect the DRA design. The use of a special weight and a viscous damper device, fitted on the tone arm, was found to effectively absorb vibrations by countering the inherent resonance characteristics of the tone arm itself. The effectiveness of the Pioneer DRA method is clearly shown (below) in the transient characteristics measured via a tone-burst test.

### DRA

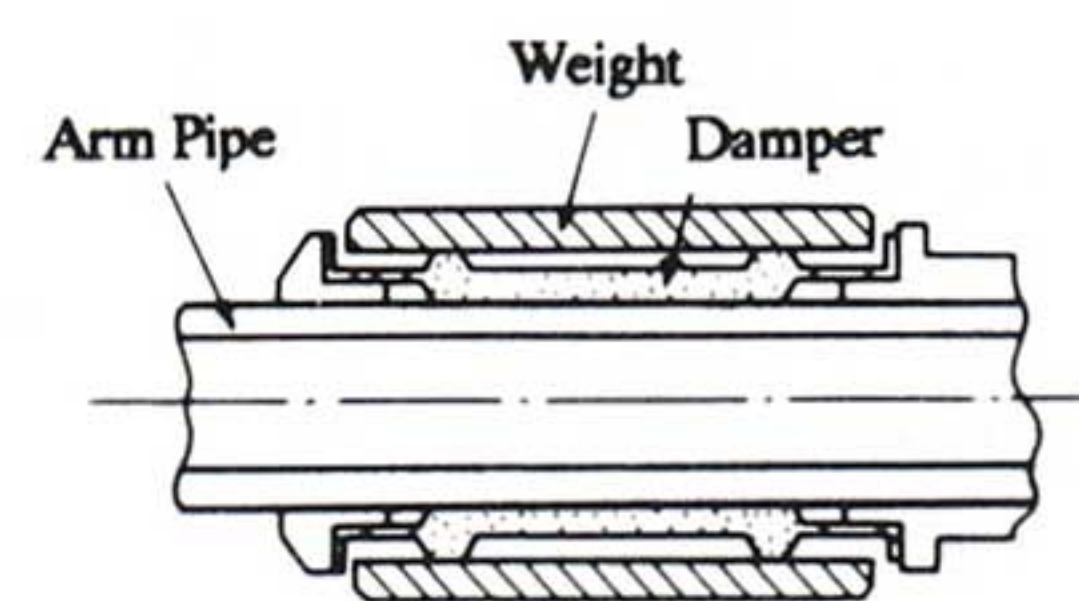
#### (1) Vibrations Occur Here!



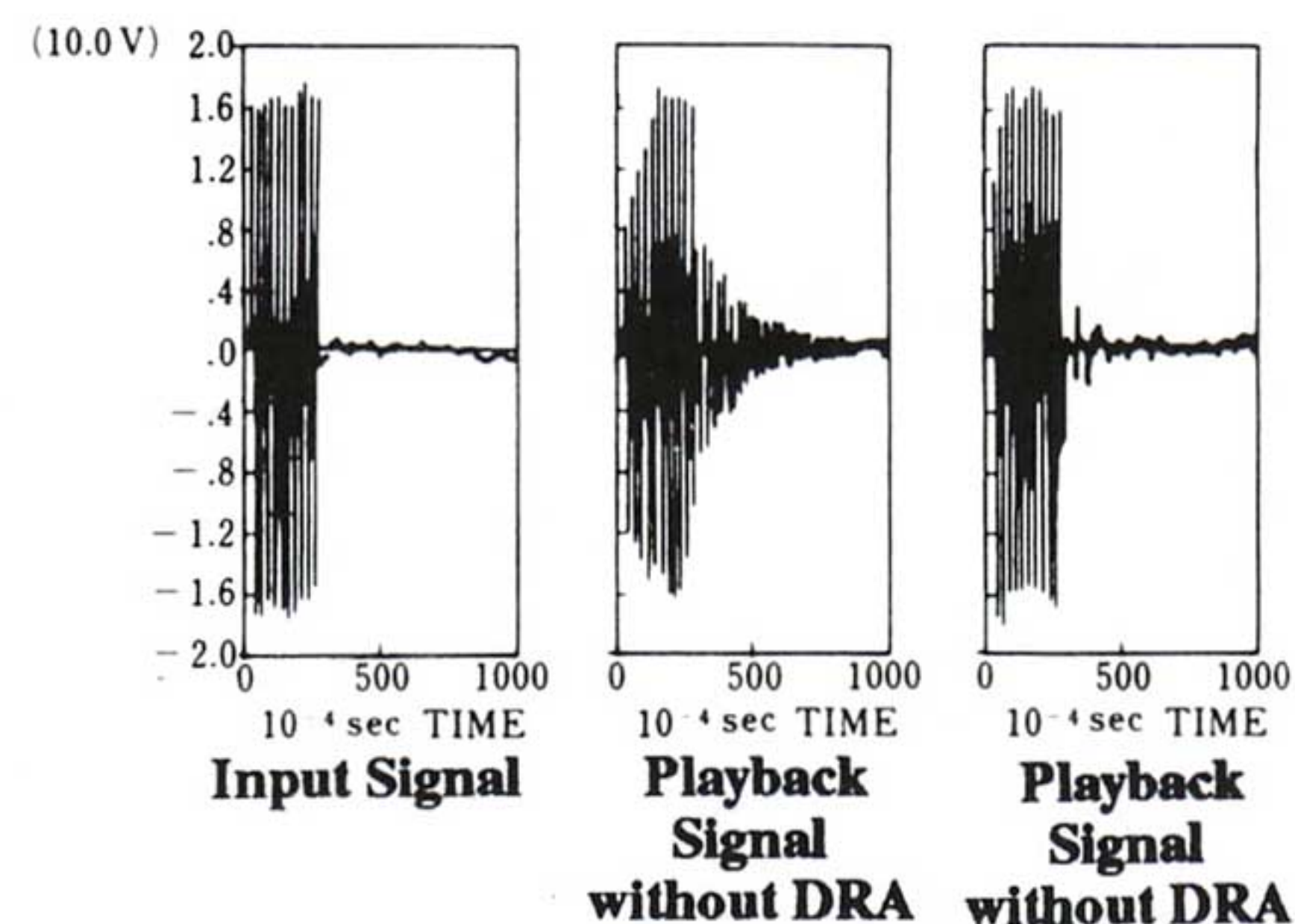
#### (2) DRA Counters Vibration There!



#### (3) Cutaway View



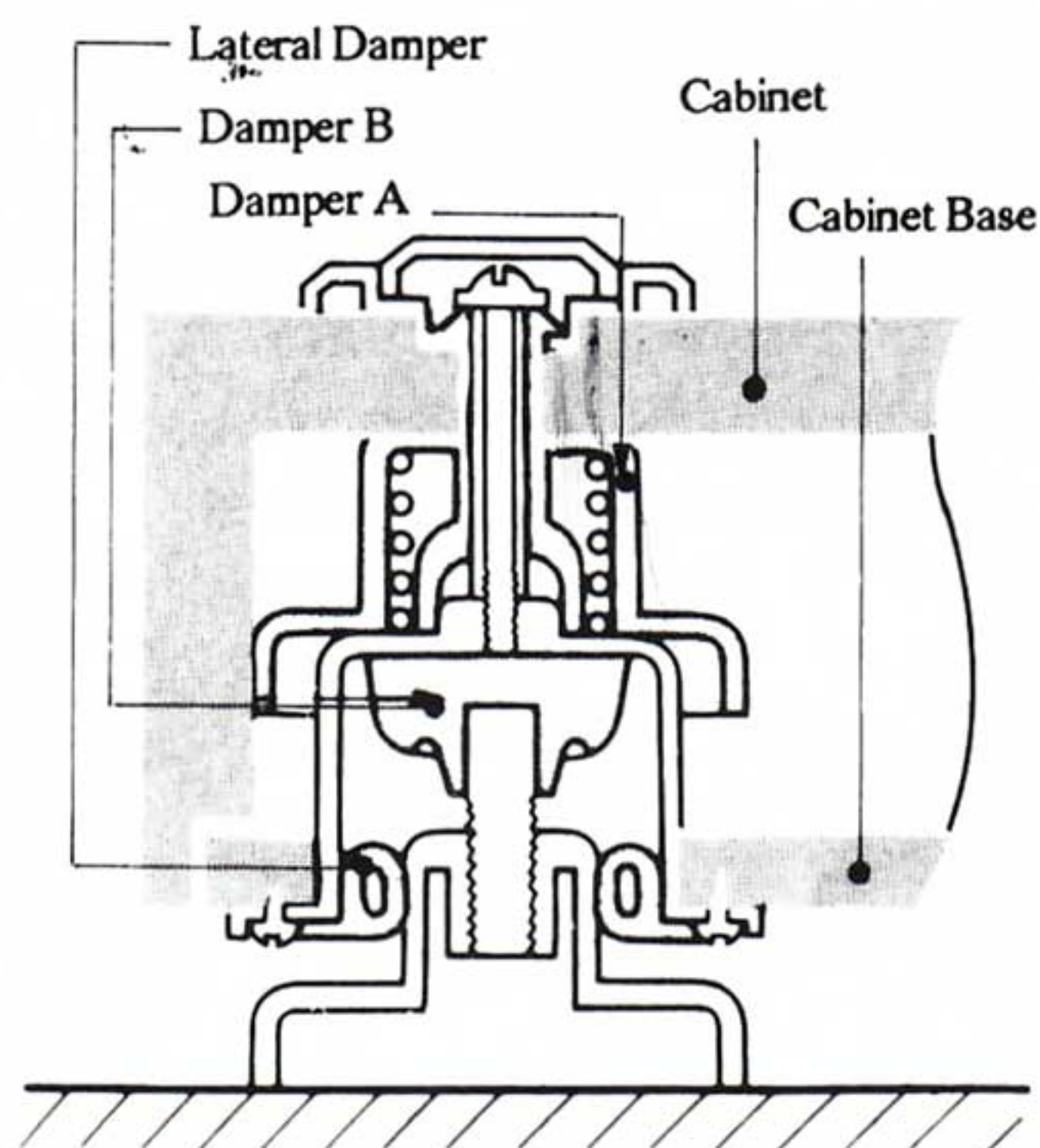
### Transient Characteristics of Resonance by Tone Burst



## Double Insulator System

With the cabinet and cabinet base separated internally by insulators and the entire unit supported by large insulators on the base itself, the player has an effective Double-Floating configuration. In addition, the system also incorporates a low-center-of-gravity design and lateral damper to effectively eliminate negative effects from internal vibrations caused by counter-force energy of rotations of the high-torque motor, from external "floor vibration" in the vertical axis, and from that horizontal type of vibration or resonance caused by sound pressure from operating speakers that could otherwise cause "howling". All in all, the Double Insulator System and DRA combine to put the Pioneer "anti-resonance" policy into practice, successfully shutting out all threats to pure musical performance and providing cleaner, more dynamic sound reproduction in keeping with the high-quality parameters of the Digital Age.

## Cutaway View: Double Insulator System



## Specifications

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**PL-90**

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### MOTOR AND TURNTABLE

Drive System:	Direct Drive
Motor:	Coreless, quartz-PLL, DC-servo motor with Stable Hanging Rotor™
Turntable Platter:	14-3/16 inches (36cm)
Inertia Mass:	655kg/cm <sup>2</sup>
Speed:	33-1/3 and 45 rpm
Wow and Flutter (WRMS):	0.018% (0.008%*)
Signal-to-Noise Ratio:	85dB (DIN B)

### TONE ARM

Type:	Statically balanced, aluminum-ceramics straight tone arm with DRA
Effective Arm Length:	11-1/8 inches (282mm)
Overhang:	9/16 inch (13.5mm)
Usable Cartridge Weight:	2.4g-12g

### MISCELLANEOUS

Power Requirements:	120V 60Hz
Power Consumption:	14W
Dimensions (W x H x D):	23-7/16 x 8-7/16 x 17-1/16 inches
(without package)	596 x 215 x 434mm
Weight (without package):	38 lbs. 2 oz./17.3 kg

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\* Measured directly from FG output.