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DENON

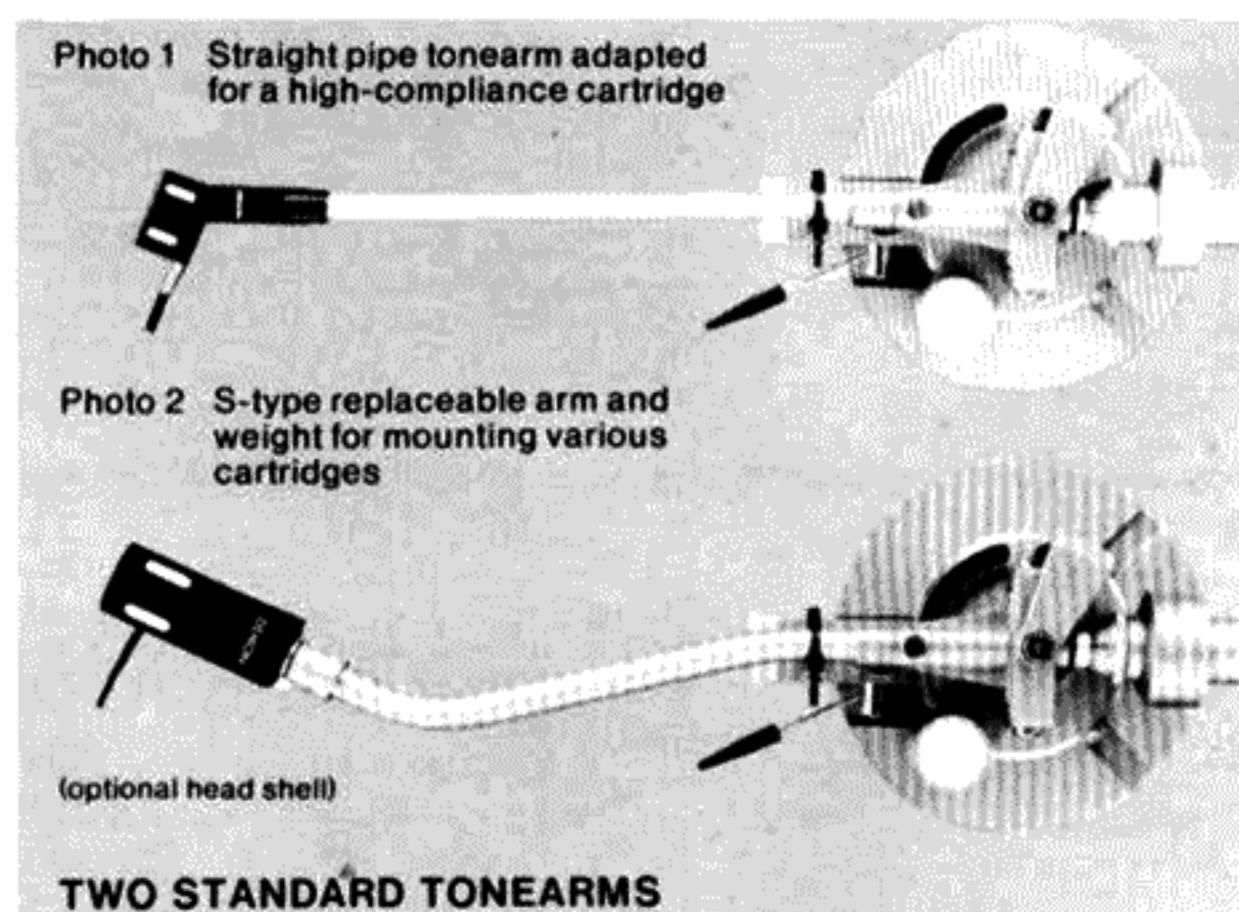
DIRECT DRIVE TURNTABLE
DENON **Quartz**
DP-60L



DENON ORIGINALITY ENSURES ULTIMATE QUALITY IN

The DP-60L is an extremely versatile high quality quartz-lock controlled turntable system that meets the high standards demanded by today's sophisticated audiophiles. This DENON turntable featuring the DENON QUARTZ SYSTEM, is the ultimate in original design technology. And for added versatility, the lightweight (5.5g) tonearm can be replaced with the universal S-type.

The whisper-quiet AC servo motor combined with DENON's quartz-lock servo control, drives the turntable at previously unheard of limits of accuracy.



DENON'S AUTO-LIFT HIGH-PERFORMANCE PLAYER SYSTEM PUTS SOUND PERFORMANCE FIRST.

MAIN FEATURES

- A no-contact end sensor auto-lift mechanism
- The lightweight straight tonearm makes full allowance for high-compliance cartridge performance
- Integrated shell and universal cartridge adaptability through the replaceable universal S-type tonearm
- A high-precision turntable speed control servo system

that combines magnetic pulse and quartz lock systems for flawless two-way servo control.

- Smooth, whisper-quiet AC servo motor
- Feather-touch back-lit control buttons
- Mirror finish, high-density Bubinga veneer laminated cabinet combines vibration resistance, solid weight, and good looks.

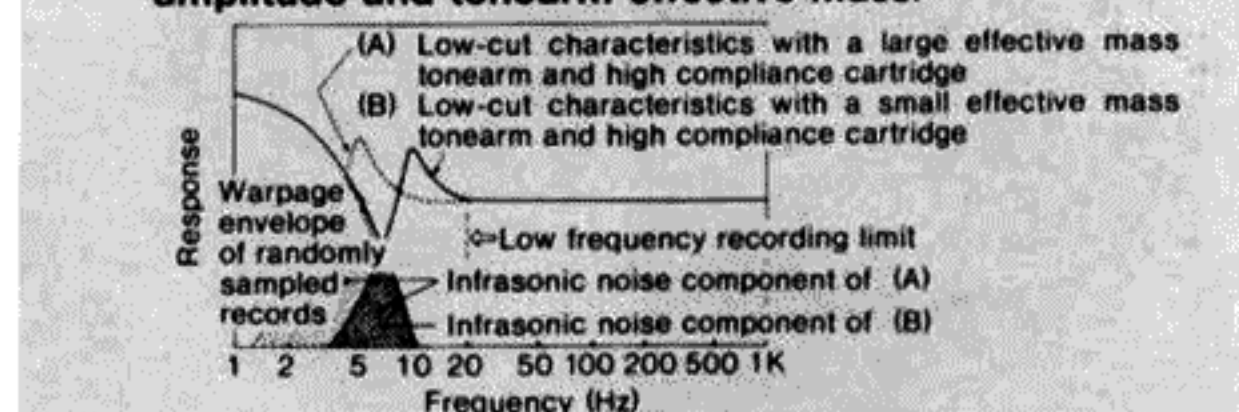
INCREASING QUALITY IN RECORDED MUSIC REPRODUCTION MUST START AT THE "ENTRANCE SOURCE"

The tonearm and cartridge should be considered a single pickup unit, as its acoustical performance determines the overall music reproduction quality of the complete audio system. If the sound signals are biased, distorted or affected by modulation noise in the signal generating phase or pickup phase, no amount of amplifier circuit refinement and speaker quality improvement will produce pure high fidelity sound. One of the most important factors regarding adaptability between cartridges and tonearms is the pickup characteristic of low frequency noises which result from warped records or runout. The low-cut level is determined by a combination of tonearm and cartridge characteristics, and to eliminate undesirable low noise, signals lower than 10 Hz should be cut off.

On the other hand, however, to improve tracking performance and lower groove wear, a low stylus force and high

compliance cartridges are increasingly employed. If these cartridges are used on large effective mass tonearms, the low cut level is pushed down and many types of infrasonic noises are picked up.

Fig. 1 Low-band characteristics caused by record warpage amplitude and tonearm effective mass.



A LOW-STYLUS FORCE AND HIGH COMPLIANCE CARTRIDGE INTEGRALLY BUILT IN TO THE LIGHT-MASS STRAIGHT TONEARM SHELL

A light effective-mass tonearm, the DA-401, has been developed to best exploit the superior performance of a low-stylus force and high-compliance cartridges. The same

design concepts have been reproduced in the DP-60L record player system. To reduce effective mass, the arm body and shell are integrally constructed, and to achieve optimum weight distribution, the arm pipe connector is positioned close to the pivot point. This specially hardened high-strength light alloy arm tube and hard resin head shell reduce the effective masses to 5.5 g, and at the same time, improve the rigidity of the whole arm system.

MUSIC REPRODUCTION AT THE "ENTRY SOURCE"

Fig. 2 Example of tonearm stylus force fluctuation during record groove tracing.

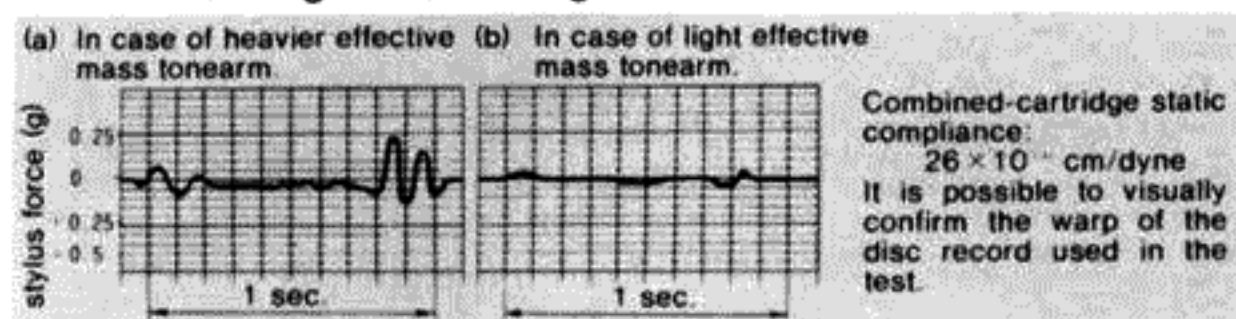


Fig. 3 Examples of stylus force—output characteristics.

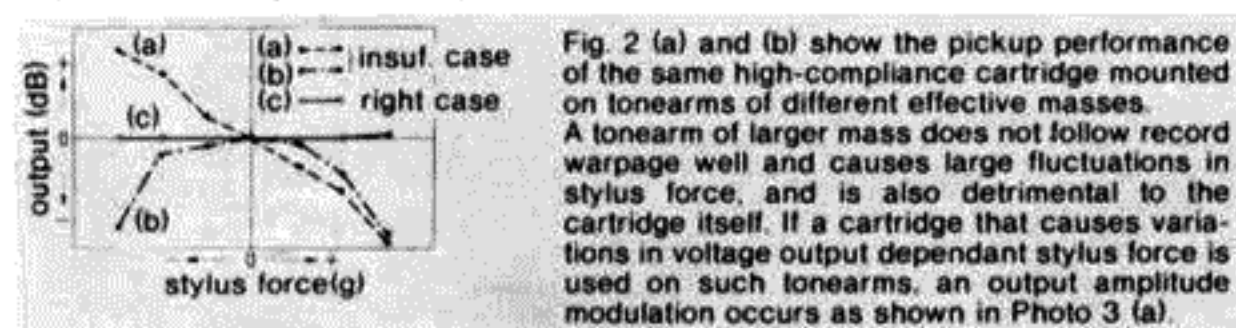
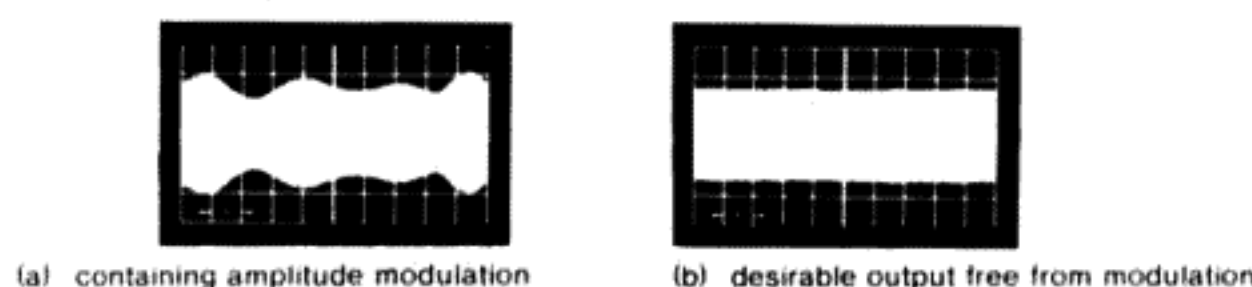


Photo 3 Output voltage for playing 1 kHz test record.



HIGH PRECISION TONEARM SUPPORT SYSTEM

To ensure very smooth horizontal travel, the tonearm body is supported by a precision hardened, ground pivot bearing at the top, and by a highly precise radial ball bearing at the bottom. This optimum span length provides for increased maneuverability on the vertical axis, and the massive aluminum diecast cylinder and arm base ensure high resistance to vibration.

The small precision lower bearing permits the cartridge output lead wires to be led through the tonearm body, out and downward to avoid any adverse influence on sensitivity.

The arm rest moves together with the arm support mechanism and permits arm height adjustment with the arm tube on the rest.

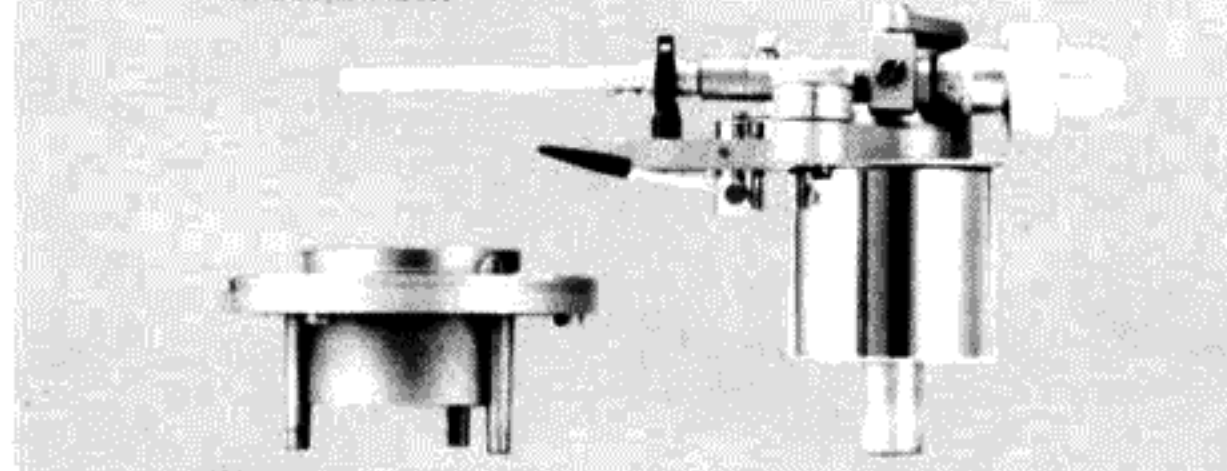
DENON QUARTZ LOCK BI-DIRECTIONAL SERVO CONTROL ASSURES HIGH SPEED DETECTION ACCURACY AND RESPONSE

A smooth and quiet AC servo motor is employed to meet the basic performance requirements for phonomotors. The DENON QUARTZ system, combining a high-precision magnetic pulse strip band and quartz lock circuit, controls the rotational speed. One thousand magnetic pulse strips are accurately pitched on the inside surface of the turntable rim and are scanned with magnetic heads. The output pulses are continuously referenced with the quartz output frequency, which results in a high detection accuracy and quick response of even minute speed deviations. (Two detection heads are used for bi-directional control.) This accurately designed mass turntable assures efficient control when the speed is changed from 45 to 33 1/3 rpm. The combination of the DENON QUARTZ servo system and the AC servo motor produce unprecedented high performance levels: an S/N ratio above 78 dB (DIN-B), a wow-flutter rating below 0.015% (DENON MODE), and a speed deviation below 0.002%. The adverse influences of record warp, stylus force deviation, tonearm position shift, supply voltage deviation, and so on, are effectively eliminated, with static and dynamic load characteristics are greatly improved.

UNIVERSAL S-TYPE REPLACEABLE TONEARM FOR CONVENTIONAL INTEGRATED SHELL CARTRIDGES

Straight tonearms with one-piece integrated shell cartridges or other conventional cartridges can be replaced with an S-type tonearm body and adjustable counter-weight. Additional straight tonearms are also available for use with high compliance cartridges.

Photo 4 High precision and massive arm support mechanism



TURNTABLE MAT BASED ON VIBRATION ANALYSIS

The turntable mat has good record holding properties, is highly resistant to vibrations and was designed employing laser holography analysis to ensure highly pure fidelity reproduction.

AESTHETIC DESIGN ENHANCES MUSICAL AMBIENCE

The solid 20 mm high-density laminate cabinet, veneered with natural bubinga and mirror-finished, exhibits clean lines and good looks.

• Electronic braking system

To avoid noise, an electronic brake is activated only after the stylus has cleared the record, bringing the turntable to a smooth, reverse drive, shock-free stop. It is then released.

- Single—line quartz synchronized stroboscope bar line
- Adjustable height large insulator
- Clear, durable, acrylic dust cover
- Low capacitance output cord

Photo 5 Magnetic pulses and magnetic head

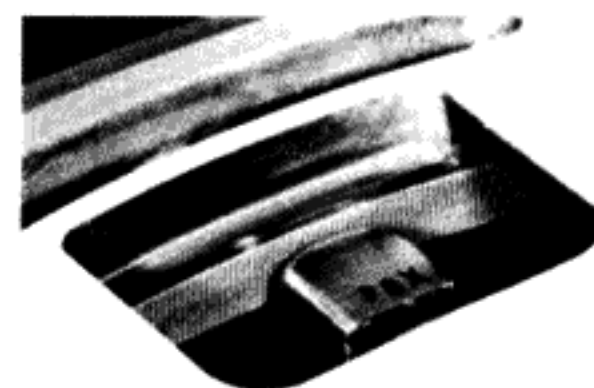
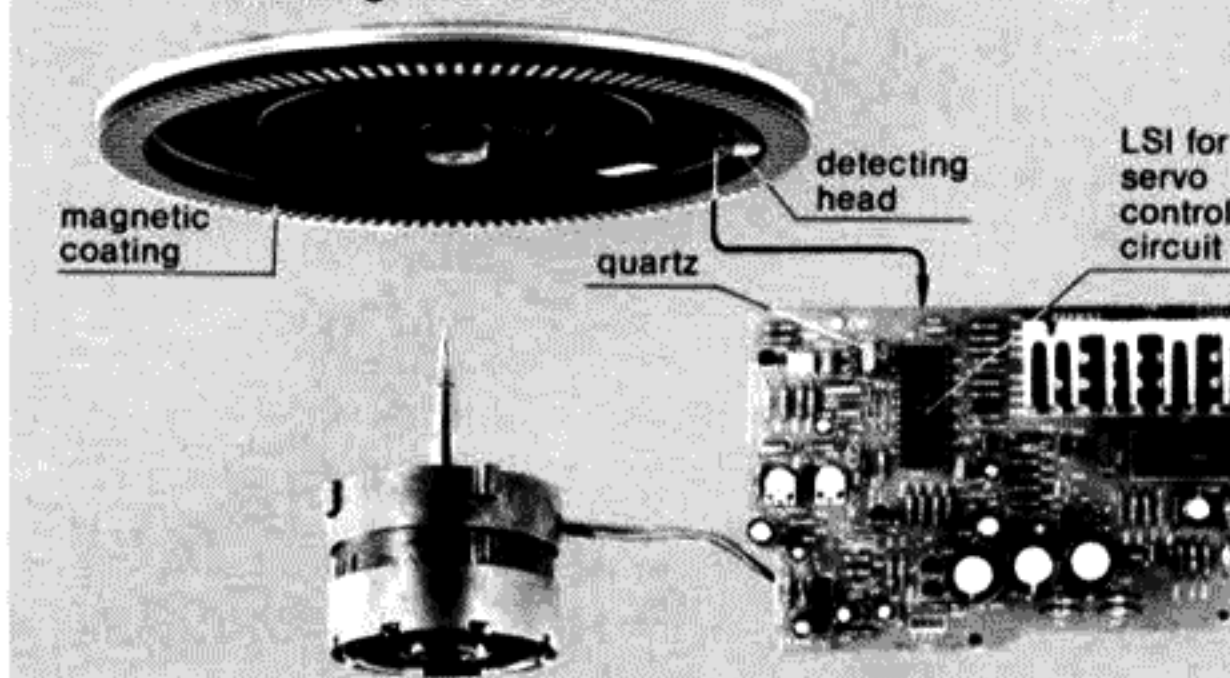


Photo 6 Quick response servo control and smooth running mechanism



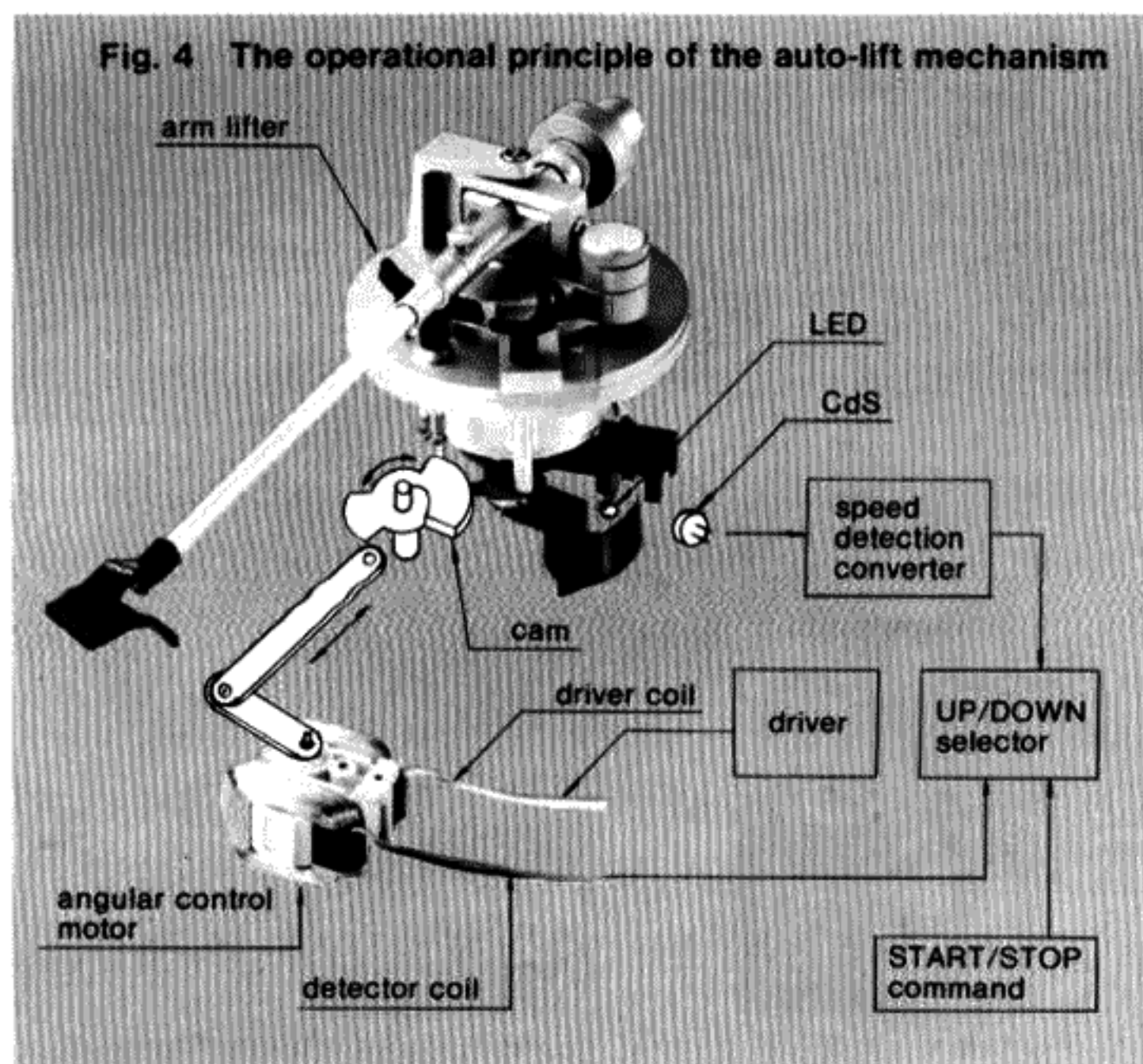
NO-CONTACT END SENSOR PROVIDES FOR COMPLETELY FREE TONEARM MOVEMENT

The DP-60L features a no-contact optical sensor to ensure reliable end detection without adversely influencing tonearm movement.

The tonearm can be manually lifted at any time, while still maintaining high tracking sensitivity.

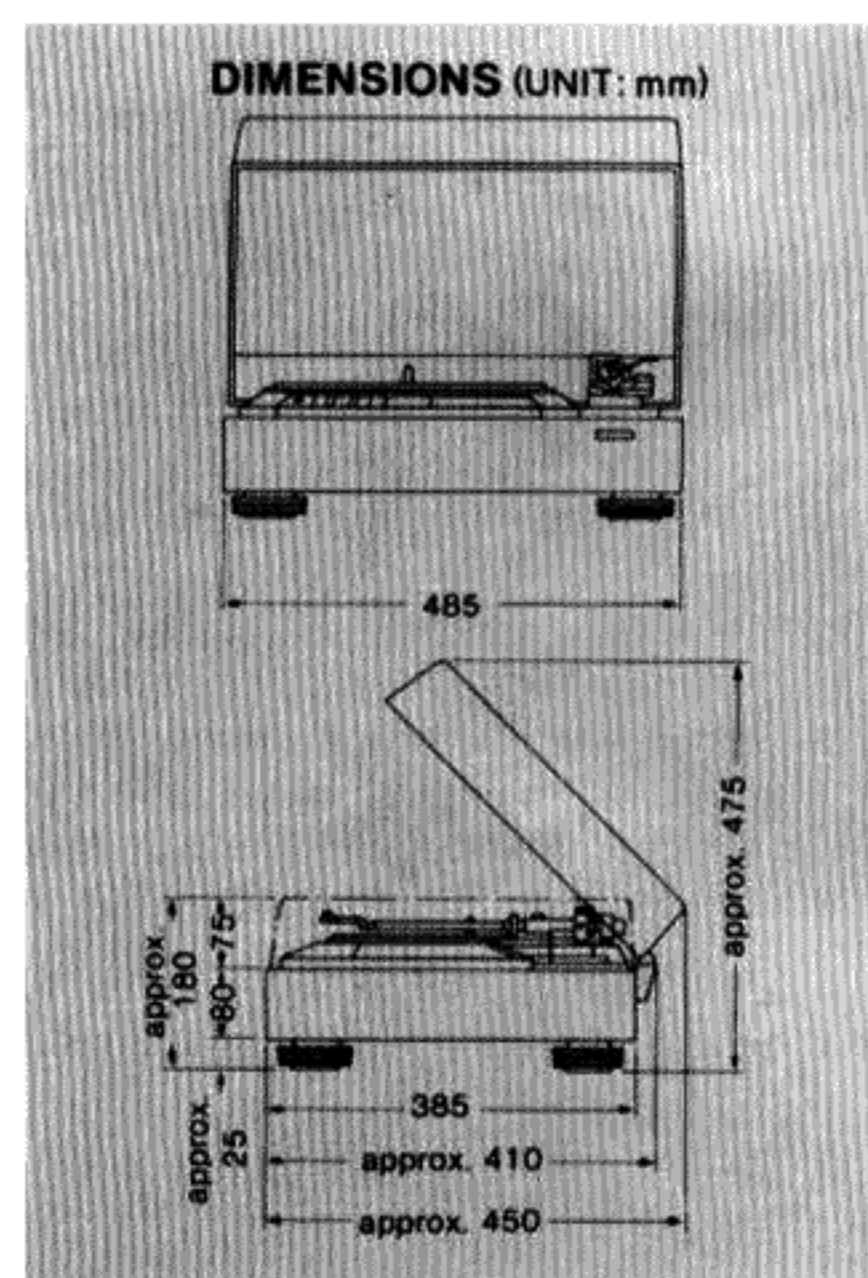
To ensure smooth movement at a constant speed, regardless of stylus pressure, arm height, and environmental temperature, the vertical tonearm is driven by an exclusive servo-controlled angular control motor.

The manual lift button is located on the diecast frame for convenient operation, and the auto-lift permits free arm height adjustment.






SPECIFICATIONS

Drive system:	Direct drive by AC servo motor
Speed control system:	Servo control with frequency detection
Speed:	33 1/3 rpm, 45 rpm
Speed deviation:	Less than 0.002%
Wow/flutter:	Less than 0.015% wrms.
Rumble:	Less than -78 dB (DIN-B)
Starting time:	Less than 1.5 sec. to reach nominal speed (33 1/3 rpm)
Load characteristics:	0% (under stylus force 100 g)
Turntable platter:	Aluminum diecast 300mm, Moment of inertia 200 kg-cm ²
Tonearm type:	Straight and S-shaped type compatible with automatic armlift
Effective length:	244 mm
Overhang:	14 mm
Tracking error:	within 2.5°
Stylus force range:	0-2.5 g/rot. (0.1 g increment)
Acceptable weight of cartridge:	4-10 g (straight tonearm, including screws) 12-18 g (S-type tonearm, including shell)
Power supply:	AC 120 V, 60 Hz or AC 200 V/220 V/240 V, 50/60 Hz
Power consumption:	15 W
Dimensions:	485 (W) × 180 (H) × 410 (D) mm
Weight:	13 kg



Specification subject to change without prior notice.

PCL-60 Straight Pipe Arm 		
PCL-7 Magnesium Alloy Head Shell 	PCL-5 Magnesium Alloy Diecast Head Shell 	PCL-4 Aluminum Alloy Shell 