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DENON

DIRECT DRIVE TURNTABLE
DENON **QUARTZ**
DP-80



**Who ever thought the record player can produce
the sound so clear as this . . .**

New and original double-construction turntable (Pat. P.)
born from the analysis of vibration

In order to improve the sound quality and the performance of the record player, it is essential to effectively cut off the “ACOUSTIC FEEDBACK”, one of the factors in deterioration of the sound quality of the record player.

Based on that theory , Model DP-80 is created through the combination of “double-construction platter” and “Out-rotor type 3-phase AC servo motor”.

The DP-80 clearly proves to you that the sound can be so different depending on the turntable.

The DP-80, a forecast of the new image of the record player, a brilliant appeal to you with the sure theory of DENON and never ceasing passion for sound.

NEWLY DEVELOPED DOUBLE-CONSTRUCTION PLATTER
(Patent pending) TO EFFECTIVELY CUT OFF THE “ACOUSTIC FEEDBACK”, ONE OF THE FACTORS IN DETERIORATION OF THE SOUND QUALITY OF THE RECORD PLAYER

Warping in the record disc, variation in the cutting level and other load fluctuation at the stylus tip by the sound groove are inherent deterioration factors of the sound quality in the reproduction of disc records.

Now that the load fluctuation has come to such a level that it is hardly an acoustic problem, DENON found it more effective to cut off the “acoustic feedback” from the speakers or the external vibration to purify the reproduced sound quality.

Needless to quote the example of “hanging bell” weighing several tons, it is a well known fact that any and every material of any form and weight has its own vibration, so called resonance. With turntable platter, too, no matter how much the weight or the internal mass is increased, this “resonance” is unavoidable. Once the platter resonates due to the sound pressure from the speakers, it becomes the echo to the signals cut to the record disc and impairs of the sound. One of the important factors to prevent the deterioration in the sound quality then is to provide the structure where “resonance” is difficult to occur.

DOUBLE-CONSTRUCTION TO TRUTHFULLY EXPRESS THE SOUND CUT INTO THE DISC WHILE EFFECTIVELY CUTTING OFF THE EXTERNAL VIBRATION.

A design born from such idea, is this double-construction turntable

based on the totally new theory. As shown in Fig. 1, the turntable platter consists of two structures; upper platter where the record disc is mounted on, and the lower platter fixed to the motor shaft. The two structures are connected by the spring and damper. That is, the upper part is isolated from the motor and cabinet in view of vibration, a kind of high-cut filter is formed by the mass of upper platter and the compliance of the spring.

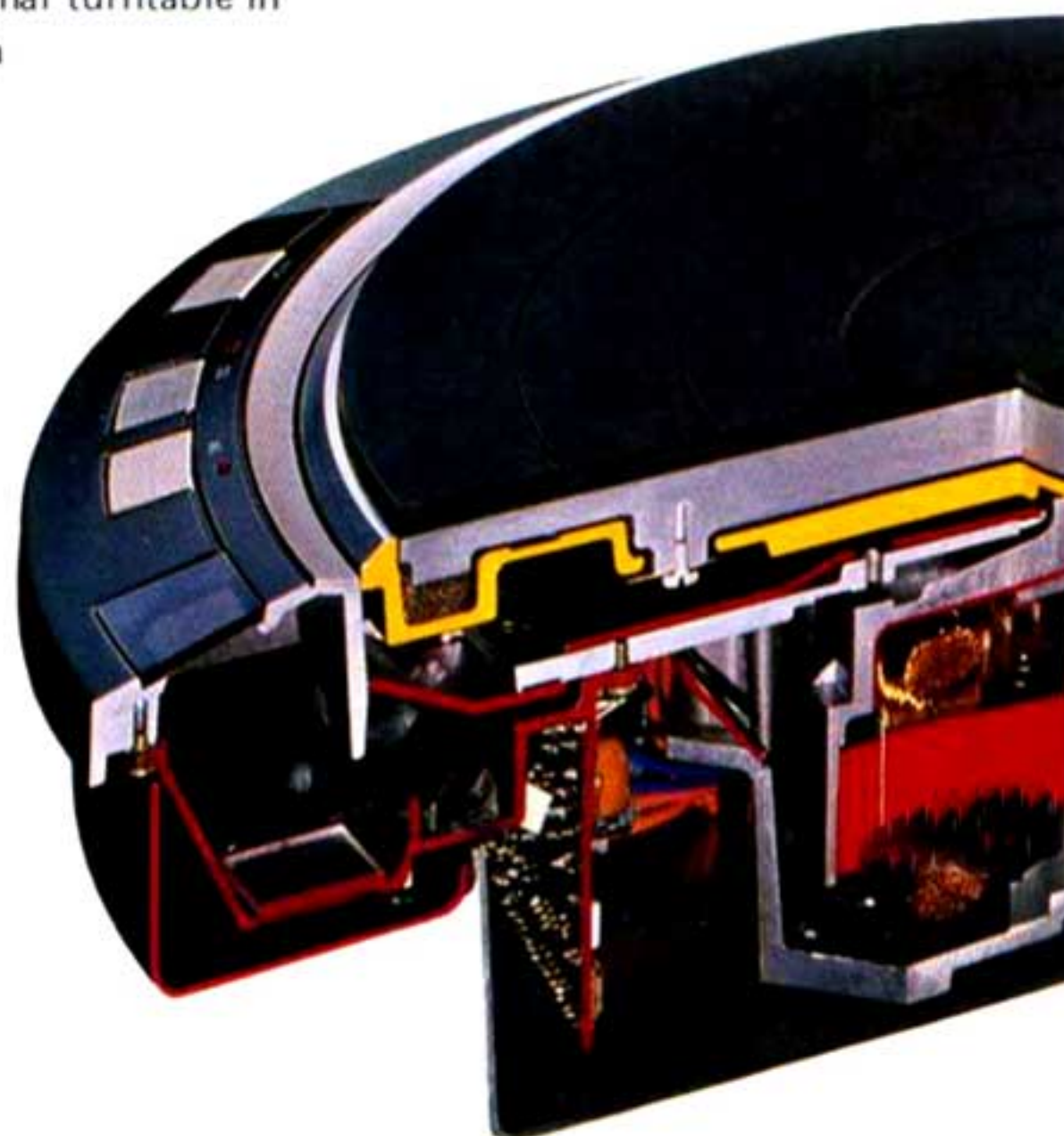
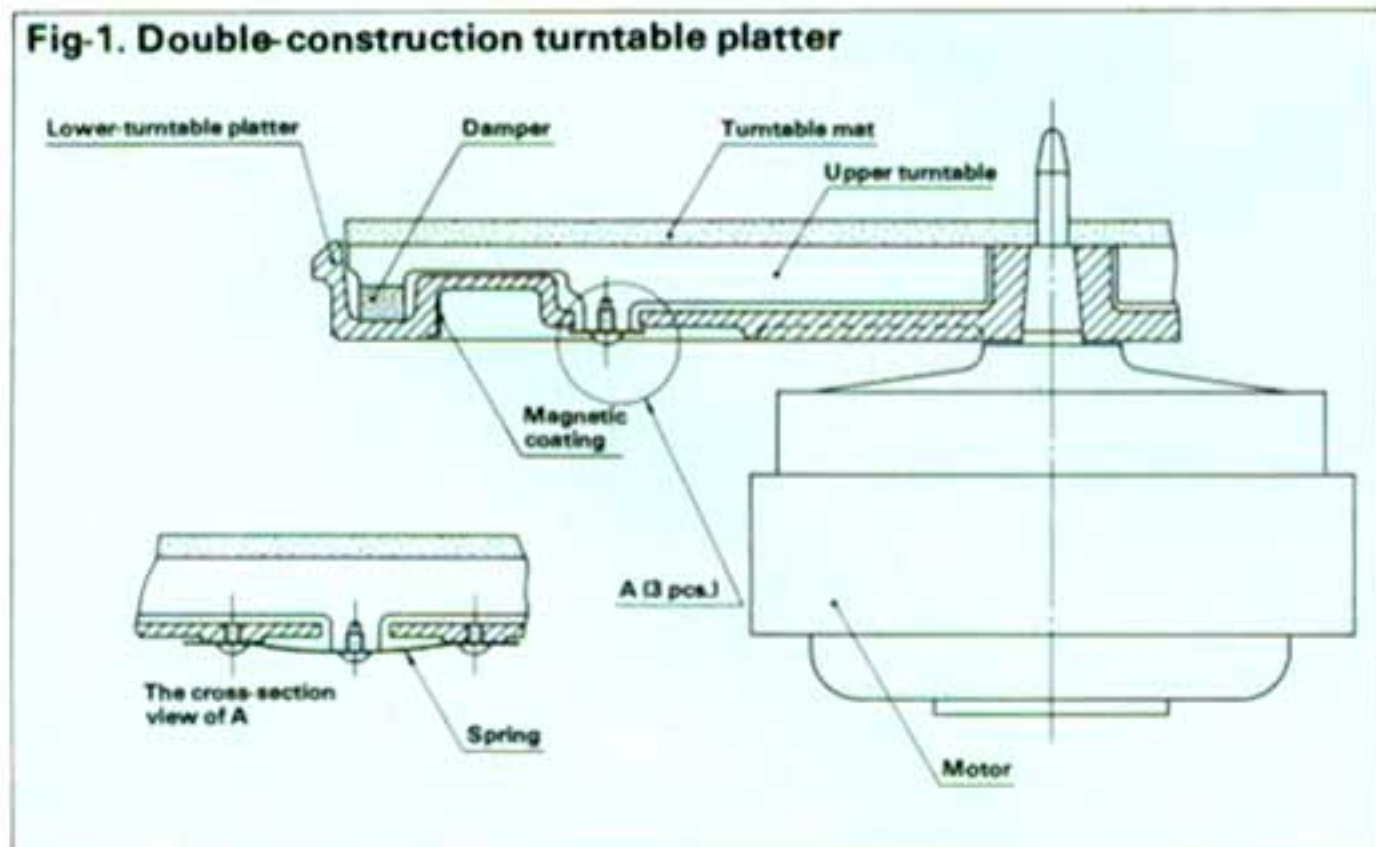
Also the upper platter and the lower designed in such a way so that they rotate together in the direction around the spindle thus the wow and flutter due to the rotational lag does not occur.

As a result, even if the player comes under the influence of the rounding vibration or the reproduced sound from the speakers, such vibration is cut off by the double-construction before it is transmitted to the upper platter or the record disc.

In addition, the sound pressure which is directly transmitted from the speaker to the record disc or the upper platter is effectively absorbed to realize the high-quality record sound reproduction. As you can see, the DP-80 is full of the original ideas unique to DENON seeking for the perfect sound reproduction.

The DP-80, so different from the conventional turntable in the design

Fig-1. Double-construction turntable platter



Theory, represents the image of the future turntable as it should really be. The sound reproduced with the DP-80 is so surprisingly clear in all the range from bass to treble. Fig. 2 shows data of comparison made between the single platter turntable (DENON) and double-construction turntable as to the vibration of the motor frame or the cabinet due to the sound pressure from the speakers. It uses the vibrator and shows how much of the vibration is attenuated at which point of the progress of the transmission of vibration from cabinet or motor frame to the turntable.

As shown in the Fig. in the frequency range above several 10 Hz, the double-construction turntable displays the attenuation characteristics over 20 dB as compared with the single platter turntable.

It is clear to you now that the double construction turntable is highly effective in the prevention of the sound quality deterioration.

Fig-2. Vibration transmission characteristics of the turntable platter

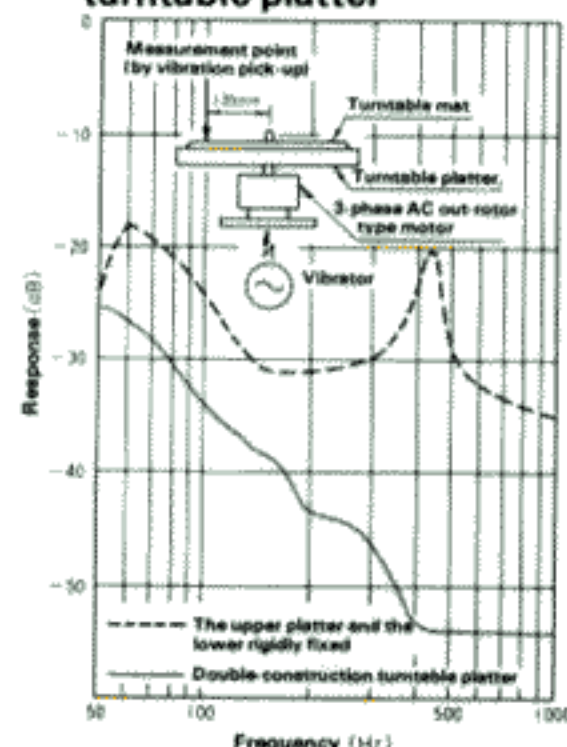
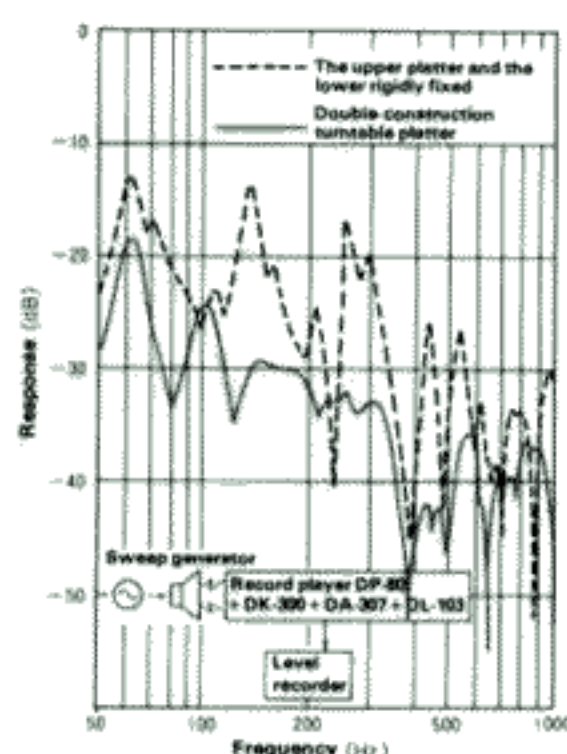


Fig-3. Howling characteristics



NEWLY DEVELOPED OUT-ROTOR 3-PHASE AC SERVO MOTOR MAKES MORE OF THE MERITS OF DOUBLE-CONSTRUCTION TURNTABLE

In addition to the double-construction turntable which effectively cuts off "Acoustic feedback", DENON has developed Out-rotor 3-phase AC Servo motor which is an improved version of DENON AC servo motor having the minimum rumbles.

The above allows to eliminate the third higher harmonic of the rotation of magnetic field which acts as the vibration or the reverse torque. Together with the structural improvement, the improvement in efficiency is much in evidence. Naturally, the heat and the vibration are now much reduced and such a low rumble of less than -77 dB (DIN-B) is realized for the quiet and smooth rotation which is a must in the improvement of the sound quality and the performance.

This out-rotor 3-phase AC Servo motor is of more than sufficient torque to drive the platter, yet accomplished a minimum vibration. For the rotor, laminated silicon steel ring core is assembled to the highly rigid diecast holder in high precision to allow much improved smooth rotation.

The pulse width modulation system (P.W.M.) of high efficiency with low waveform distortion employed for the motor drive circuit not only contributes greatly to the improvement of rumble but it increases the effectiveness of the reduction in the power consumption brought by the out-rotor 3-phase AC servo motor and suppresses the heat and the vibration at their minimum.

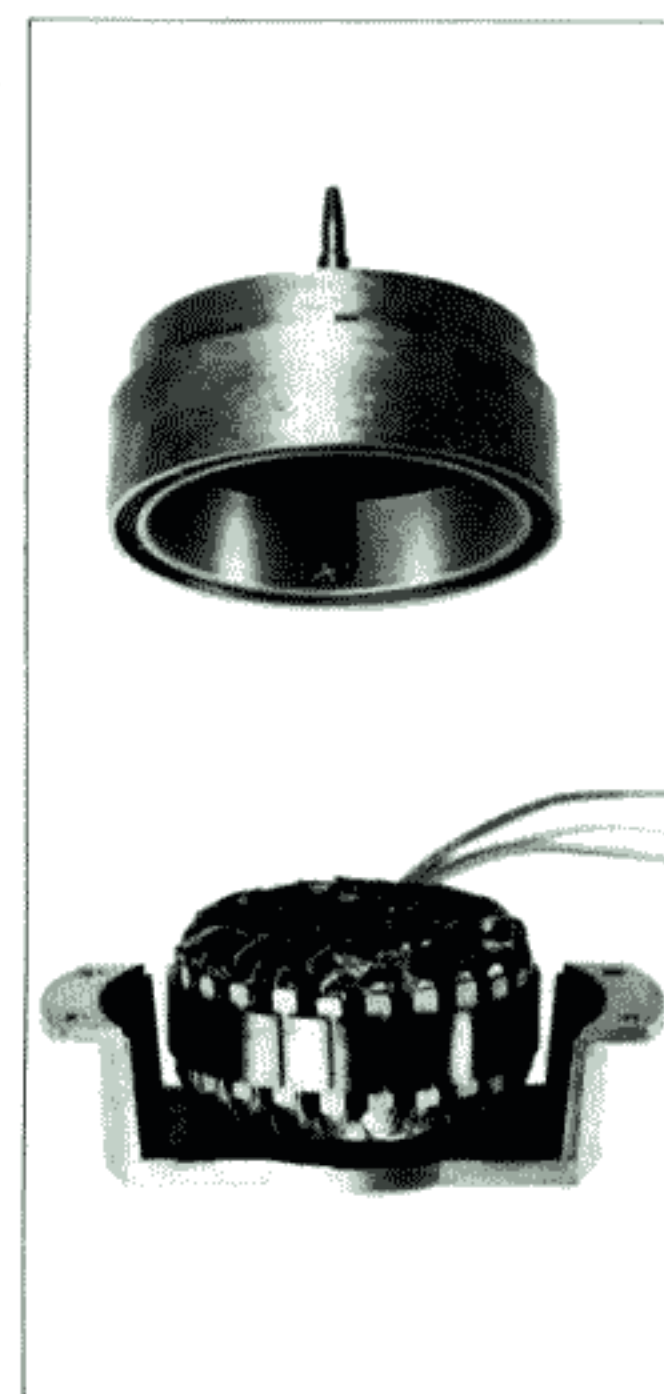
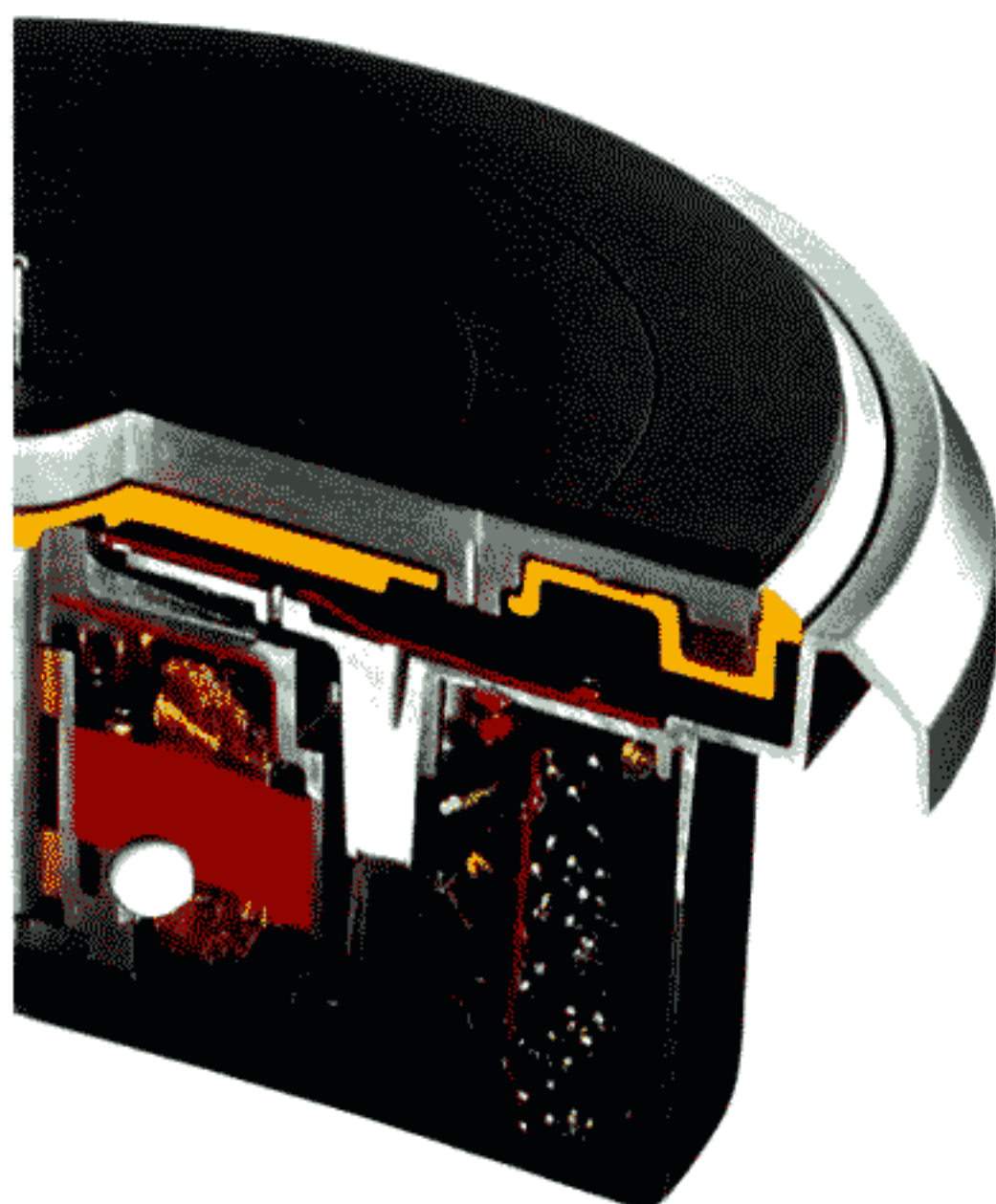
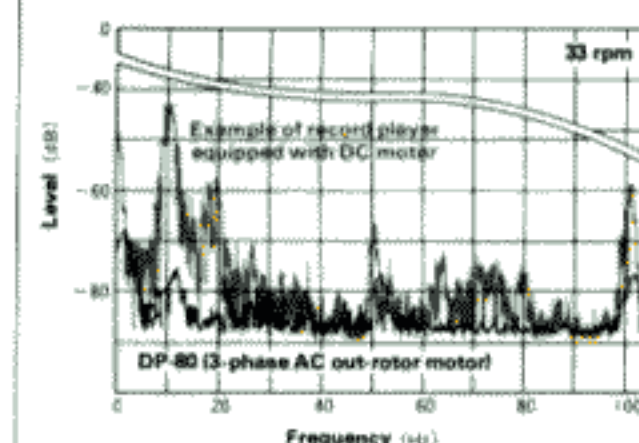


Fig-4. Comparison of rumble between 3-phase AC out-rotor motor and DC motor



SPEED SERVO AND PHASE-LOCKED LOOP (PLL) SYSTEM BY DENON'S UNIQUE MAGNETIC RECORD DETECTION SYSTEM OF EXCELLENT DETECTING PRECISION AND RESPONSE

In addition to the DENON'S unique magnetic record detection system which has been displaying excellent performance in all DENON record players, PLL is employed for the rotational speed detection system.

DENON speed control system accurately detects the rotational speed of the turntable and compares it with the reference voltage. The phase-locked loop, on the other hand, is a system which controls the speed while comparing the phase of the output signals of the detector with the phase of the reference signal by the quartz oscillator. Generally speaking, the phase control system by quartz has merits such as excellent stability 1) against the temperature change and secular changes, 2) against the load fluctuation due to pickup and 3) against the influence of the power voltage fluctuation. From the point of improving the wow flutter and the starting characteristics, its speed detecting precision and the quick response is required above all.

The original high degree of the detection precision, DENON'S unique magnetic record detection system enhances full benefit of the quartz phase control.

DENON magnetic record detecting system detects 1,000 pulses recorded with an extremely accurate pitch to the inner side of the rim. The detected frequency is 555.5 Hz for 33-1/3 rpm; considerably higher detecting precision and quicker response is allowed which proves to be highly effective against the external interference such as the warping of record disc, variation in the cutting level appearing several times per second.

The unique combination of the magnetic record detection system having excellent detection accuracy and response with the phase

control system by quartz crystal is referred to as DENON QUARTZ. Wow and flutter of less than 0.015% and the rotational speed deviation of less than 0.02%, figures almost the limit in this respect is nothing but a proof of DENON QUARTZ capability. Even a stylus force of 250g on the extreme perimeter of the disc can not affect the platter speed.

DENON thinks that phase-locked loop using quartz crystal is only a part of essential requirements for the improvement of the fundamental performance of the record player.

Measurement method developed by DENON is used to measure wow and flutter.

Conventionally, wow and flutter are measured using lacquer discs. However, since this method results in the inclusion of the wow and flutter of the cutting machine in the value. Therefore, the accuracy of the cutting machine or the eccentricity of the test disc becomes a problem. Fig. 7 shows the new method developed by DENON. Measurement is made by employing a lightweight wheel which is accurately centered and contains pulses magnetically recorded with high precision, and the pulses are detected by a non-contact magnetic head.

Fig-5. Wow and flutter characteristics (un-weighted) at 33-1/3 rpm.

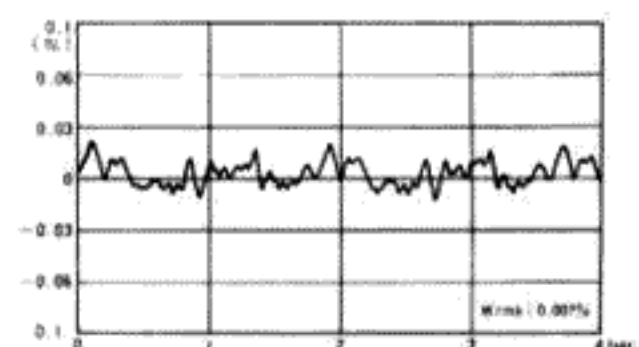
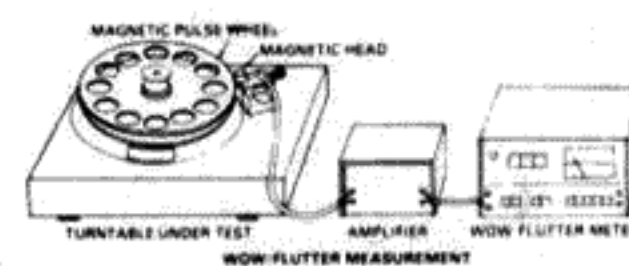


Fig-6. Wow and flutter measurement



MAIN SPECIFICATIONS

| | |
|--------------------------------|---|
| Drive system: | Direct drive by 3-phase AC servo motor |
| Speeds: | 33-1/3 rpm and 45 rpm |
| Wow and flutter: | Less than 0.015% Wrms* |
| Rumble: | Less than -77 dB (DIN-B) |
| Rise time: | Less than 1.2 sec. to reach 33-1/3 rpm. |
| Platter: | Casted aluminum alloy, 308 mm diam. |
| Speed adjustable range: | More than $\pm 6\%$ of nominal speeds (at variable) |
| Motor: | 3-phase AC out-rotor type servo motor |
| Speed control system: | Speed servo control by frequency detection system combined with phase control system with reference to the quartz crystal oscillator. (Speed servo control only at variable speed mode) |
| Load characteristics: | 0% (Under 250g loads) |
| Brake system: | Electronic brake |
| Speed deviation: | Less than 0.002% |
| Power supply: | AC 100V 50 Hz/60 Hz |
| Power consumption: | 8W |
| Dimensions: | 376 diam. x 140(H) (mm) |
| Weight: | 10 kg |
| Suitable cabinet: | DK-100F, DK-100G, DK-200, DK-300 DK-200G |

A separate step-down power transformer should be purchased for using Model DP-80.

Specifications

| | |
|--------------------|---------------------------------|
| Input: | AC 117V/220V/ 240V, 50/60 Hz |
| Output: | AC 100V, 50VA |
| Dimensions: | 135(W) x 105(H) x 160(D) mm |
| Weight: | Approx. 2.9 kg |



Step-down transformer
Part No. 2339019

* Measured by DENON'S method using magnetic pulse wheel.

** Above specifications are subject to alteration without notice.