OUTER DISC STABILIZER

Guide Book

DS-20

OPTIONAL ACCESSORY FOR KD-750/650/600 TURNTABLES

OUTER DISC STABILIZER (DS-20)

OWNER'S MANUAL

For greater listening pleasure, read this manual carefully to get the best performance your DS-20.
Every DS-20 is carefully inspected before it leaves the factory. If the DS-20 is found to have been damaged during shipment, please contact your nearest KENWOOD SERVICE DEPOT.

FEATURES

- Transient Load Theory, a subject of intensive research at Kenwood laboratories, seeks to clarify the complex mechanical interface between the record disc, the driving turntable platter and the tracing stylus. Our studies have shown that this interface is a major source of sound deterioration. The DS-20, born of these studies, effects a dramatic reduction in the factors that degrade phono performance.
  The conventional approach places a stabilizer at the center, over the record label. But the addition of the DS-20 stabilizes the outer edge of the disc placed on the turntable sheet. This not only assures the correct mechanical impedance below the stylus, but enhances the vibration resistance of the disc itself. The effect, particularly at low frequencies, is a major improvement in overall disc performance.
- For peak performance the DS-20 should be used with the optional TS-10 CERAMIC TURNTABLE SHEET.

CONTENTS

INSTRUCTIONS FOR USE

① Place the disc you wish to play on the turntable sheet.
② Place the POSITIONING GAUGE on the disc.
③ Place the DS-20 on the disc edge, properly aligning it with the POSITIONING GAUGE.
④ When the disc edge is properly held by the DS-20, remove the POSITIONING GAUGE.
⑤ Place the DS-21 INNER DISC STABILIZER on the disc label, and commence playing.

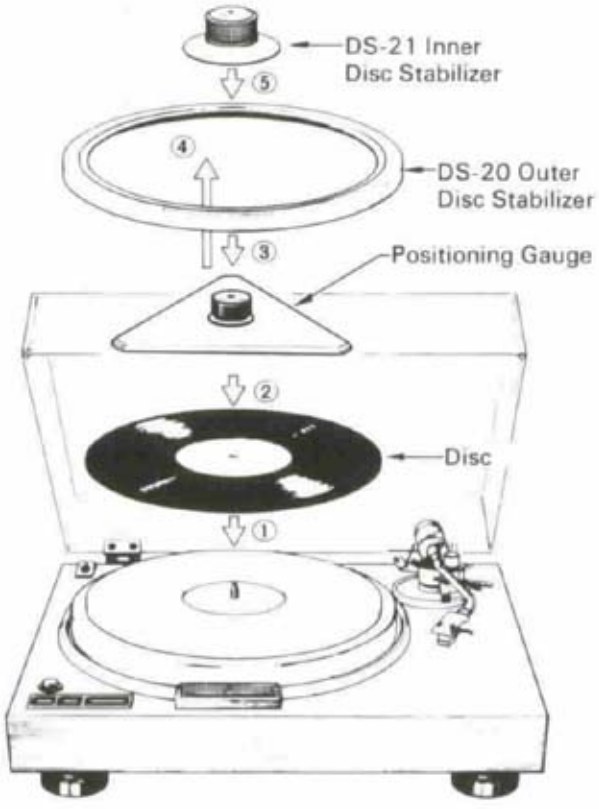


Fig. 1

HANDLING PRECAUTIONS

- Although the DS-20 is designed to fit turntables of other manufacturers, it can not be used in certain cases due to differences in platter diameters and other factors.
- The DS-20 holds the disc as illustrated in Fig. 10 in Section 8. Portions of the cartridge body may, however, touch the stabilizer in accordance with the shape or tracking force used. (For further details, see Sections 7 to 11.)
- It is adviseable that the Positioning Gauge always be used for correct positioning. However, you may be able to set the stabilizer in the the proper position without the aid of the Gauge, when accustomed to the setting.
- Placing the DS-20 and DS-21 Inner Disc Stabilizers on the disc considerably increases the moment of inertia of the turntable. This naturally increases the time required for the platter to reach its selected turning speed when started.
- If only the DS-20 is used (without the DS-21 Inner Disc Stabilizer), the center portion of the record will be raised from the platter surface. Make sure the DS-21 Inner Disc Stabilizer is used in conjunction with the DS-20.
- This DS-20 is designed exclusively for 12 in. discs.

REFERENCE DATA 1

Measurement of vibration-proof effect due to higher disc rigidity

Disc vibration is usually measured by means of two high-sensitivity magnetic cartridges. For current measurements, data was gathered for several types of turntable sheets. After the DS-20 and DS-21 (Inner Disc Stabilizer) were set on the disc placed on the sheet, the transfer function between the two points on the disc where each magnetic cartridge was placed was measured while vibration was applied with a vibration transduser to a specific point on the disc.

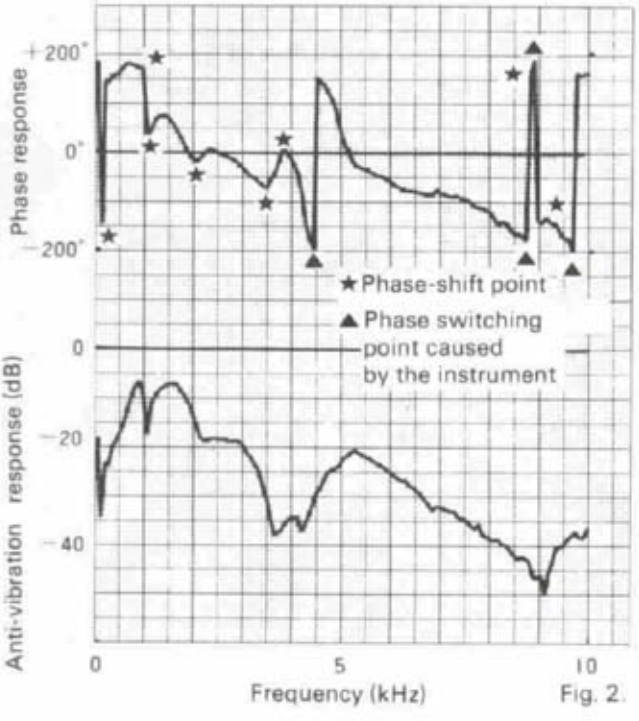


Fig. 2.

How to the read data:

- Phase Response

As the number of phase-shift points increases, phase rotation also increases, causing poorer localization of the original sound source.

Also, a large number of phase shifts causes poorer balance in reproduction of acoustic field.

- Anti-vibration response

It is desirable that the attenuation seen in the anti-vibration response be as large as possible. Furthermore, a smoother vibration-proof response, with less peaks and dips, is considered even more desirable.

① **For a rubber sheet only:**

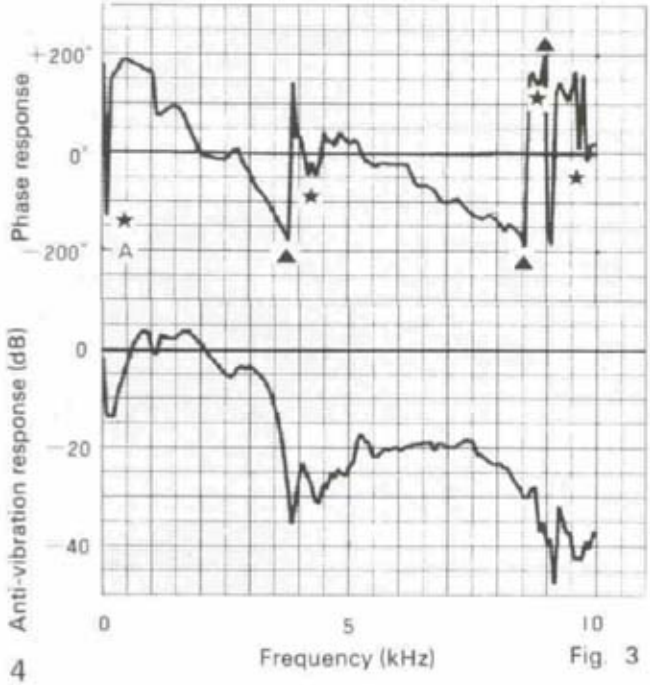


Fig. 3

- Phase response

Sharp phase shifts are observed at points marked ★ in the figure at left. Especially note the phase shift at point A caused by insufficient rigidity of the rubber sheet, and which cannot be improved using platter sheets made of rubber materials.

- Anti-vibration response

Level variations in the anti-vibration response are conspicuous in the figure. The greater attenuation seen at high frequencies is due to the vibration absorption by the rubber sheet, though the effect is not seen at low frequencies.

② Rubber sheet plus the DS-20 and DS-21 (Inner Disc Stabilizer):

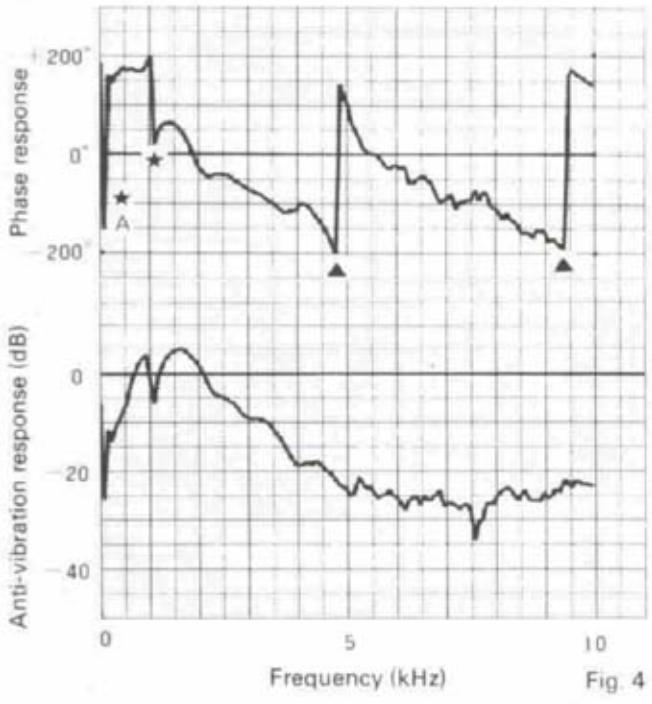


Fig. 4

- Phase response

Sharp phase shifts are markedly reduced and a smoother overall response is obtained. However, the phase shift at point A still persists.

- Anti-vibration response

It is clear that the response is much smoother when compared with that of the rubber sheet only. It should be noted that the use of the DS-20 and DS-21 (Inner Disc Stabilizer) provides a higher rigidity of the disc itself, suppressing vibrations not by means of absorption but by the higher rigidity of the disc.

③ For a glass sheet only:

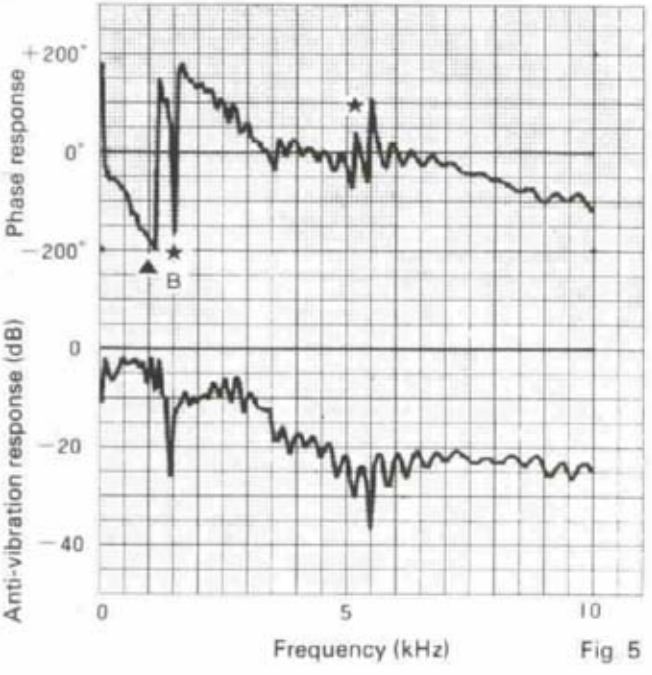


Fig. 5

- Phase response

Point B in the figure left, indicates a vibration inherent to the glass sheet. Other minute phase variations are due to minute resonances of the disc.

- Anti-vibration response

Although many minute resonances of the disc and specific vibrations of the glass sheet are seen in the response, vibrations are, on the whole, suppressed evenly over the entire frequency band.

④ Glass sheet plus the DS-20 and DS-21 (Inner Disc Stabilizer):

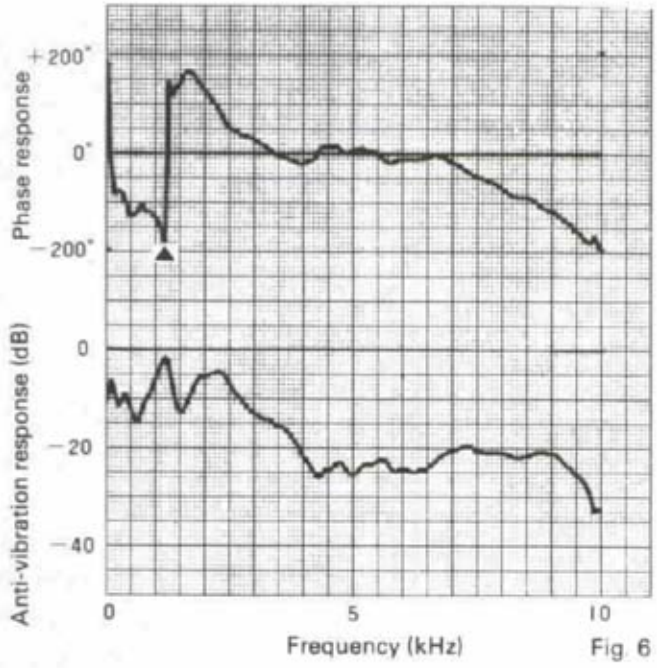


Fig. 6

- Phase response

Both the specific vibrations of the glass sheet and the minute vibrations of the disc are well suppressed and steep phase variations are mostly eliminated, offering a nearly ideal phase response.

- Anti-vibration response

Vibrations are suppressed evenly over the entire frequency range with less level variations achieved. This response shows a typical anti-vibration characteristic resulting from high rigidity.

⑤ Ceramic turntable sheet (TS-10) plus DS-20 and DS-21 (Inner Disc Stabilizer):

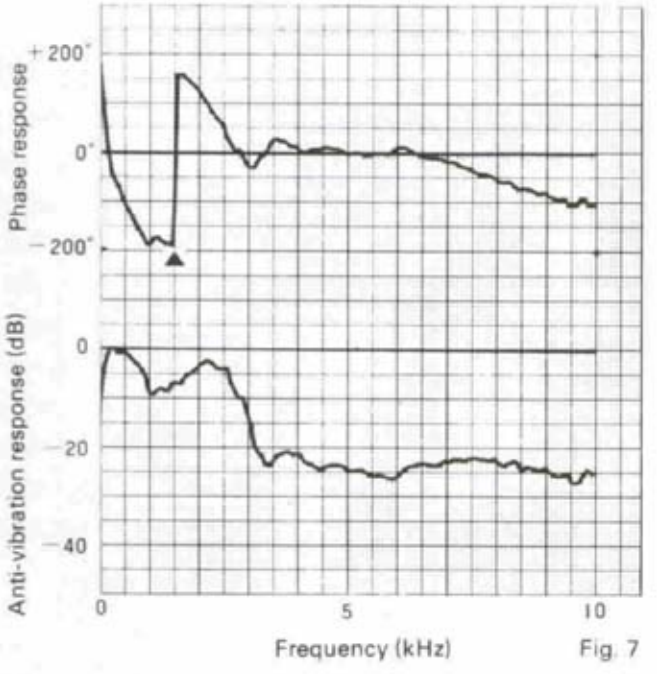


Fig. 7

- Phase response

This response is similar to that obtained with the glass sheet plus DS-20 and DS-21 (Inner Disc Stabilizer) described above. However, the phase variations are further reduced as the ceramic sheet is more rigid than the glass sheet.

- Anti-vibration response

The response is almost flat above the middle-low frequencies, implying coloration-free reproduction which is next to ideal.

REFERENCE DATA 2

Positional relationship for the disc, cartridge and Outer Disc Stabilizer

1. Outermost lead-in groove (non-modulated groove)

The IEC Standards for 12-inch LP disc dimensions are as follows:

Outside diameter	301.6 ±0.8 mm (11-7/8 ± 1/32 in.)
Margin diameter, the outer set-down limit of the reproducing stylus	297.7 mm (11.719 in.) min.
Diameter outermost groove at recording pitch	292.6 mm (11.520 in.) max.
Thickness	1.5 ~ 2.3 mm (0.059 ~ 0.090 in.)

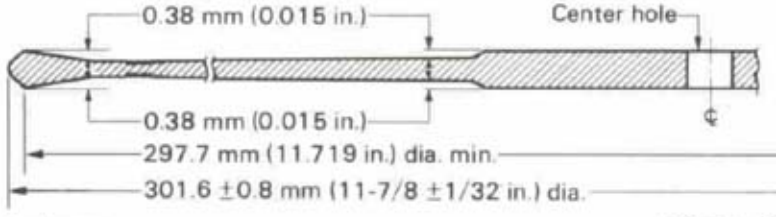


Fig. 8

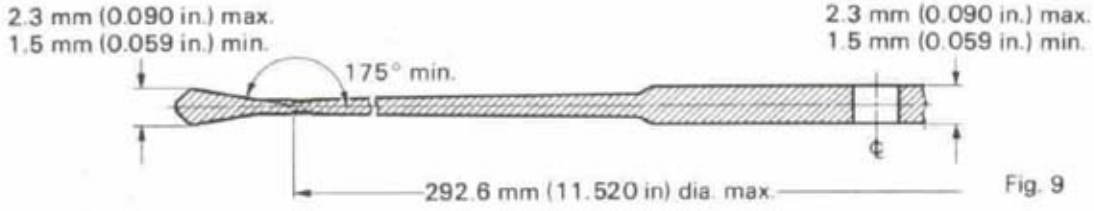


Fig. 9

When checking the dimensions of records now available on the market, it appears that all records do not meet the IEC Standards. (For an example, refer to Reference Data 3. Sectional profiles of 12 inch LP disc edges.)

The outside diameter of most discs is reasonably uniform (80% falls into the specified range 301.0 ~ 301.9 (11.85 ~ 11.89 in.), but the diameter of the outermost groove of less than 292.6 mm (11.52 in.) is not rigidly observed. Some records have an outermost groove diameter such that the cartridge body may touch the DS-20 depending on cartrdige shape or tracking force used (Figs. 10 and 16), causing problems in tracing.

Also, the cartridge body may touch the DS-20 in the outermost lead-in groove as the lead-in groove diameter is not standardized. In such cases, immediately lower the stylus before the modulated grooves. (Figs. 17 to 21)

The DS-20 Outer Disc Stabilizer is designed to conform with IEC, EIA, JIS, and DIN Standards and Regulations for phono-discs.

Note:

The IEC standard regulates the lead-in groove to 0.8 to 1.6 mm (1/32 to 1/16 in.).

2. Difference between disc edge thickness and inner thickness

The IEC standard regulates the difference between the disc-edge thickness and inner thickness to less than 0.38 mm (0.015 in.). According to measured data or surface roughness data, however, some discs have a difference of more than 0.4 mm. Others have a sharply descending bank from the disc edge towards the disc center with the lead-in groove, or even have the modulated groove located on the middle of the bank. (See Figs. 16, and 18 to 21.) With such records, the cartridge body is apt to touch the Outer Disc Stabilizer, making tracing of outermost grooves impossible. (In such a case, however, the cartridge body may touch the groove guard of the disc when the Outer Disc Stabilizer is not used.)

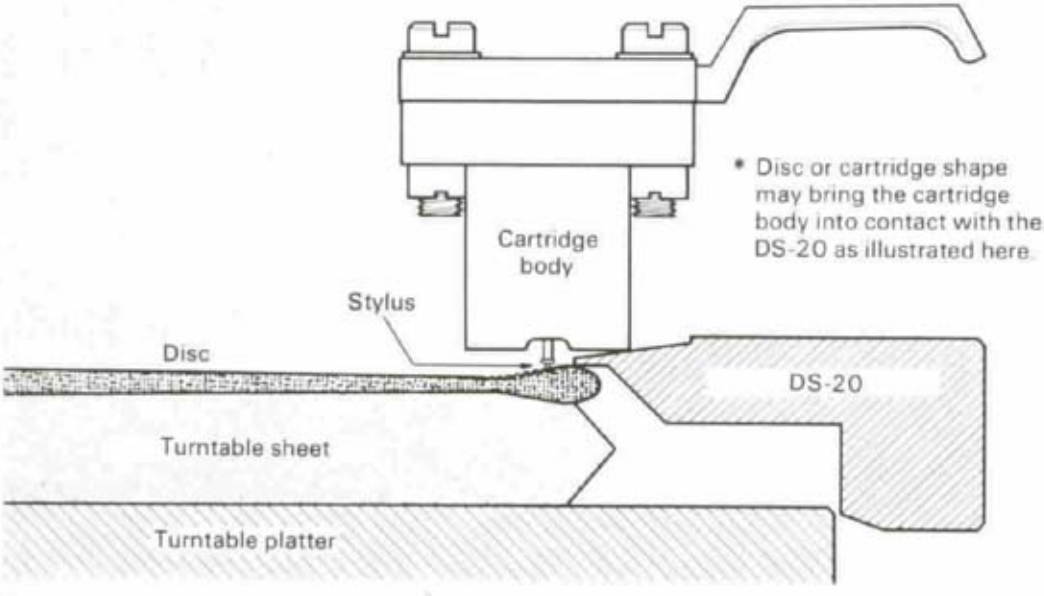


Fig. 10. Positional relationship between the disc and cartridge or DS-20

3. Phono-cartridges

The clearance between the stylus chip and cartridge body of phono-cartridges now available on the market is not regulated. (No regulation is so far provided by IEC or other standards.) Although it is generally designed to be more than 0.8 mm (0.0315 in.) when tracing at the specified tracking force, some cartridges have a clearance of less than 0.5 mm (0.0197 in.). With such cartridges, the cartridge body may touch the groove guard even when records that meet the IEC standards are played. It should be noted that the cartridge body, as shown in Fig. 11, may touch the DS-20, since the use of the Stabilizer adds approx. 0.5 mm (0.0197 in.) to the disc edge thickness. The cartridge having edge cuts as shown in Fig. 12, however, raises no particular problem in edge-groove tracing.

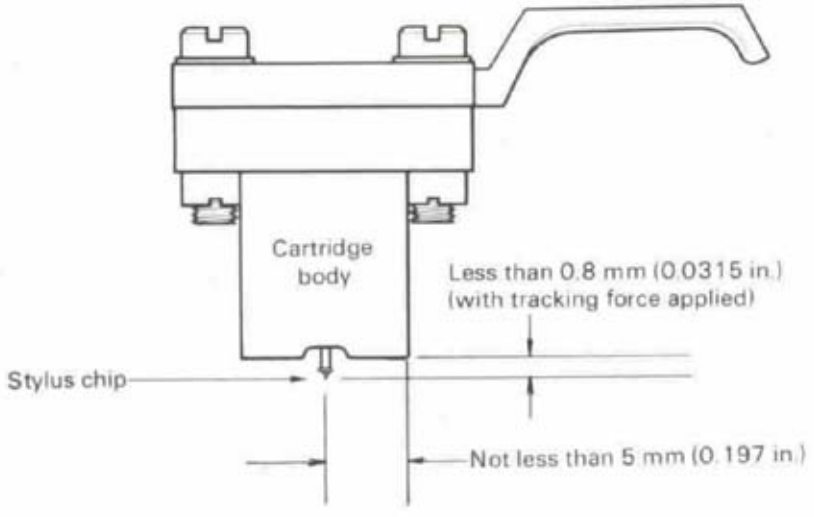


Fig. 11. Front view of a phono-cartridge

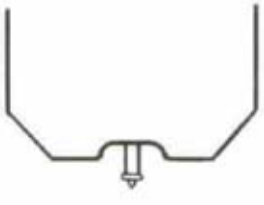


Fig. 12.

REFERENCE DATA 3

Sectional profiles of 12" LP disc edges

In planning the DS-20, we checked the sectional profiles of 12" LP disc edges by using a surface roughness meter. As mentioned in Reference Data 2, the results of the measurements show that all records now available on the market do not necessarily comply with the standard. The following illustrates some of the measured results:

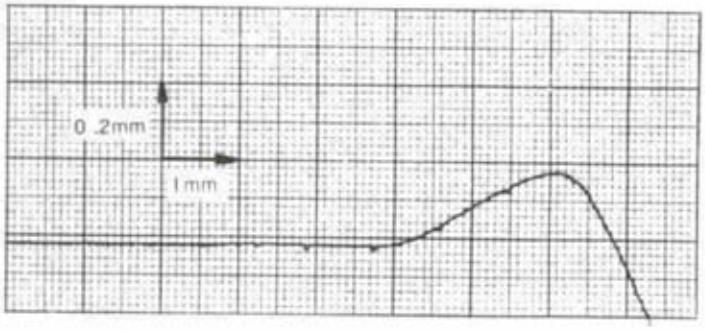


Figure 13.
A record well shaped to conform with the IEC standard.

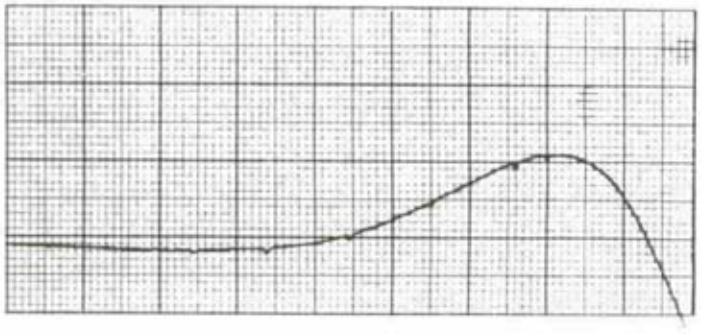


Figure 14.
This too is a well-pressed disc within the IEC standard.

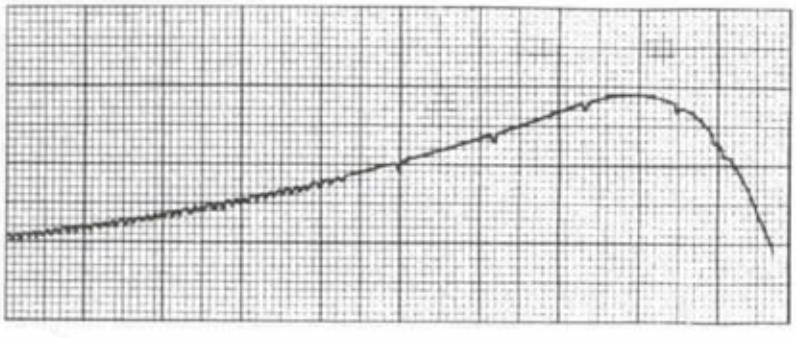


Figure 15.
An "out-of-standard" disc of which lead-in grooves are located on the top of the groove guard and, in addition, the modulated grooves start in the middle of the groove guard. (The modulated grooves are not level.)

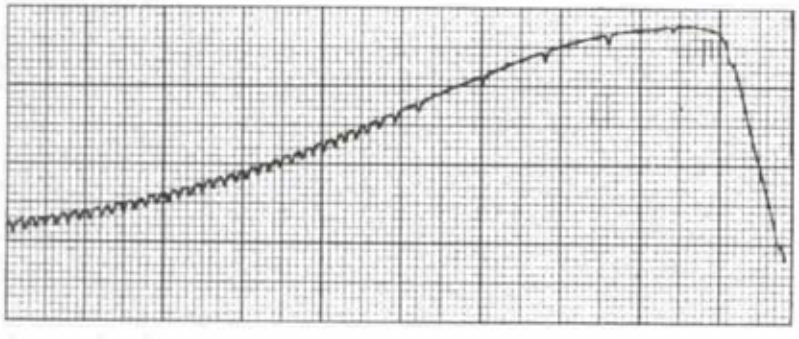


Figure 16.
This is another "out-of-standard" record similar to the above case. The difference between the groove guard height and modulated-groove level is very large, approx. 0.55 mm (0.0217 in.).

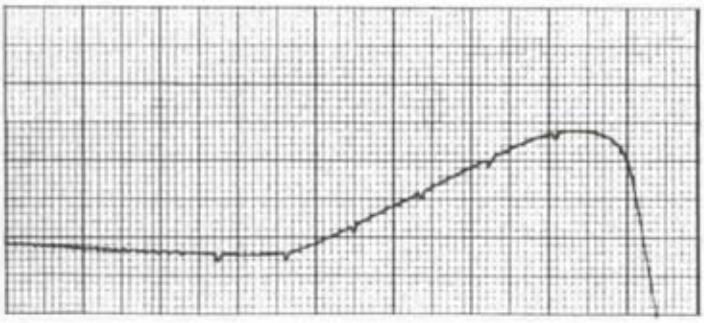


Figure 17.
Though the groove guard is slightly higher, this record is pressed almost to conform with the IEC standard. It is adviseable that the stylus be lowered at the foot of the groove guard as the lead-in grooves are cut from the top of the groove guard.

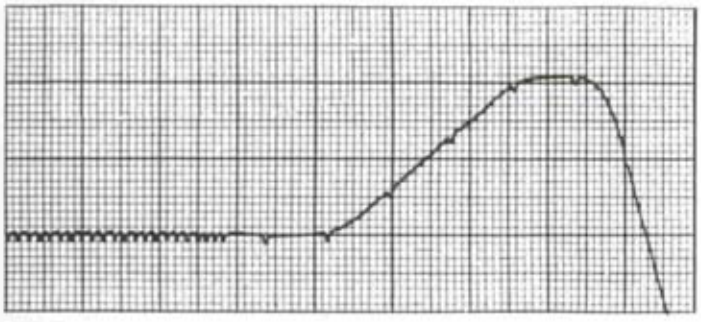


Figure 18.
This disc has a relatively high groove guard of approx. 0.4 mm (0.0157 in.). As in the above case, it is necessary to lower the stylus at the foot of the groove guard as the lead-in grooves are cut from the top of the guard.

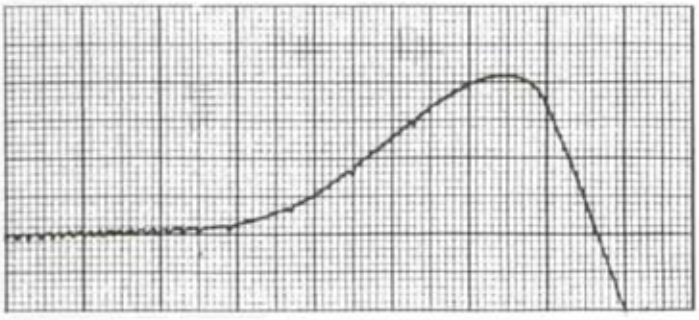


Figure 19.
This record also has a relatively high groove guard of 0.5 mm (0.0517 in.).

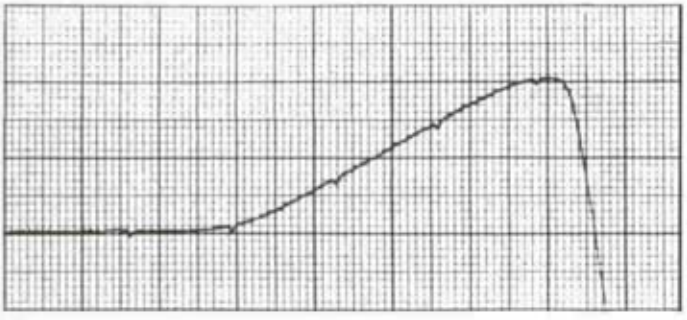


Figure 20.
The groove-guard height of this disc is also 0.4 mm (0.0157 in.). With this record, the stylus should be lowered at the foot of the groove guard.

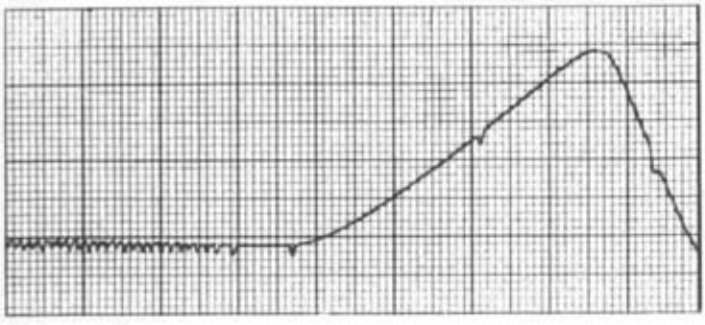
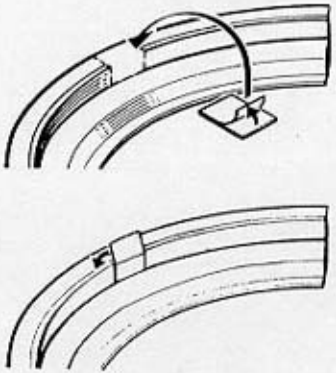


Figure 21.
This is a typical disc that has a considerably high groove guard of approx. 0.5 mm (0.0197 in.) and a steep groove-guard bank. When the DS-20 is used for such a record, the stylus should be lowered just before the modulated grooves.

- When applying DS-20 to our turntable of 330mm (13') in diameter, attach the location compensating felts (supplied) to four places in the rear side of outer circuit stabilizer at equal intervals as shown in the figure below.



- Before attaching the felt, brush away the hand-stain and dust on the outer circuit stabilizer.
  If it is tried again, the adhesive strength will be weakened.

SPECIFICATIONS

Outer Disc Stabilizer

Material	Brass
Moment of inertia	400 kg-cm^2
Dimensions:	
Outer diameter	348.0 mm (13.701 in.)
Inner diameter	298.0 mm (11.733 in.)
	(For other principal dimensions, see the following figure.)
Weight	1,350g (2.98 lbs.)

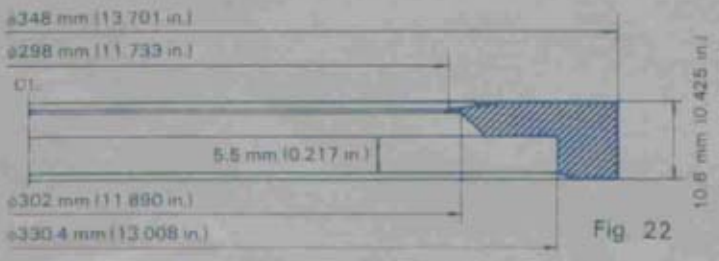


Fig. 22

Positioning Gauge

Material	Aluminum
Dimensions:	
Outer diameter	297.8 mm (11.725 in.)
Height	24.0 mm (0.945 in.)

TRIO-KENWOOD follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

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