ALPHASON
SPECIALIST AUDIO

HR-200S

Reference Tonearm
Owner's Manual

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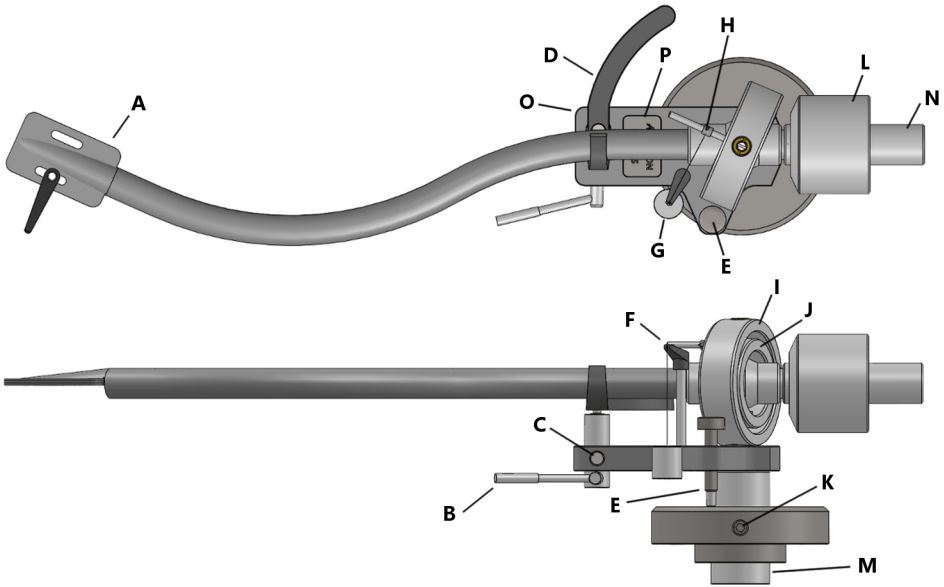
A
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A. Head Shell
B. Cue Arm
C. Cue Device Locking Screw
D. Tonearm Rest
E. VTA Adjustment Screw
F. Bias Pulley Block
G. Bias Weight
H. Bias Sleeve
I. Outer Ring
J. Inner Ring
K. Piller Locking Screw
L. Counter Weight
M. Piller
N. Counter Weight Thimble
O. Cue Platform
P. Name Plate

Mounting The Arm

The HR-200S uses the three point mounting with the same dimensions as a Linn mounting. The distance from the platter spindle to the tonearm pivot centre is 210.346mm for the 9 inch HR-200S; 250.865mm for the 10.5 inch; and 291.255mm for the 12 inch HR-200S. If fitting to another manufacturers turntable, the supplied template should be used as a guide to ensure correct position and alignment.
Note: It is always important to contact your turntable manufacturer if in any doubt before making any holes in plinths or arm boards.

If the arm-board or tonearm mounting plate must be cut, proceed in accordance with the following instructions -
1. Place the supplied mounting template so that the record spindle fits through the hole whilst keeping the mounting template flat.
2. Swing the template to the most convenient position, allowing a 66mm radius clearance for counter weights.
3. Pass a long needle vertically through the centre point marked 'A' into the mounting board.
4. Disengage the template from the spindle and lower onto the mounting board using the needle as a guide.
5. Spike through the centre points of the three 5.5mm holes, marking the mounting board.
6. Remove the template and drill the three 5.5mm holes and cut away the area indicated by the shading, 32mm in diameter.

Audio Leads

After mounting the arm, trim the audio leads to ensure that they do not interfere with any deck suspension systems. The cable may need to be looped to ensure maximum sub-chassis isolation.

The lead with the red identification band is for right channel. The ground wire must be connected to the pre-amplifier ground terminal and to a suitable terminal or screw on the turntable chassis. To avoid hum the system must be connected to main ground by one path only, usually from the pre-amplifier to the third pin of the mains. Multiple earth paths will increase hum. Capacitance of leads is approximately 70pF.

Height Adjustment

Adjust the height of the arm by loosening the pillar locking screw on the mounting bush. Adjust the height of the arm until the top of the cartridge is parallel with the record surface with the stylus in contact with the record. Secure the pillar locking screw. See the section titled Vertical Tracking Angle (VTA).

Fitting Of Cartridge

To prevent damage, remove stylus from cartridge or ensure stylus is guarded. Fit cartridge to headshell positioning the finger grip on to cartridge mounting screw on top of the head-shell. Leave screws finger tight. Check that the screws do not touch the record surface. Sometimes it is convenient to invert the screws, placing the nuts on top of the headshell. Plastic washers may be fitted to prevent marking the top of the head shell.

Leave the cartridge mounting screws finger tight until the Horizontal Tracking Angle adjustment is complete (see page 9.)

Fit the Pin Jacks to the cartridge terminals using a small pair of fine nosed pliers – White to left channel: Red to right channel: Blue to left ground: Green to right ground.

The Pin Jacks provided with the HR-200S are designed and manufactured by Alphason Specialist Audio. Each Pin Jack embodies a six fingered, spring loaded receptacle which provides repeatable contact force on every insertion and accommodates variations in terminal diameter. This ensures the optimum signal path and should not need any further adjustment. Connections to the cartridge terminals must never be soldered.

You can find further information on the Pin Jack connectors on our web site.

Tracking Force Adjustment

Tracking force is the amount of down force that will be applied by the stylus on the record. The amount of tracking force required should be defined by the cartridge manufacturer.

The first objective is to “statically balance” the arm, which is to achieve the proper weight balance such that the arm “floats” level. After achieving static balance, you will then need to adjust the counterweight to apply the required tracking force as specified.

To set the tracking force, locate the counterweight thimble to the rear of the tone arm. Screw out the counterbalance thimble until the black ring is just visible. Fit the counterweight to the thimble and adjust until arm is balanced. Lightly tighten the counterweight locking screw. Then, apply the required tracking force specified by the cartridge manufacturer by screwing in the counterweight thimble

The following only applies to the 9" arm. See Technical Data Sheet section for equivalent values for the 10.5" and 12" arms) -
For the standard counterweight, one turn of the thimble gives 0.25g tracking force.
For the intermediate counterweight, one turn of the thimble gives 0.35g tracking force.
For the large counterweight, one turn of the thimble gives 0.50g tracking force.

Intermediate and large counterweights are available as accessories.

Tracking Force Adjustment

It is preferred to have a large counterweight close to the bearings. This adds mass close to the bearings and minimises the effective mass of the tonearm.

Tracking force may be adjusted by ear and optimised to suit the listener's taste. Use the cartridge manufacturer's recommended mean tracking force as the starting point, ie if the recommended tracking force is 1.8 to 2.0g then start at 1.9g. The recommended tracking force is designed to position the coils correctly in the magnetic field of the cartridge.

Reducing tracking force usually gives a "thinner" more detailed sound. However, beware of distortion due to mis-tracking if the tracking force becomes too light, especially on the inner grooves of the record. Increasing tracking force usually gives a more "solid" and "authoritative" sound, however increasing tracking force compromises the reproduction of fine detail. These adjustments are subjective.

There is a need for caution as mis-tracking may damage the record grooves. Also, a higher tracking force will increase record wear.

To achieve precise tracking force, we recommend the use of a digital tracking force scale.

Horizontal Tracking Angle (HTA) & Alignment

The Horizontal Tracking Angle or HTA, is the fore/aft adjustment of the cartridge within the headshell. By moving the cartridge position forward or backward in the headshell, the angle that the cartridge will describe over the entire playing surface of a record can be altered and optimized.

To adjust the HTA on the HR-200S, place the alignment protractor provided over the centre spindle and adjust the cartridge or arm mounting position until the stylus accurately follows the curve. Then ensure the cartridge aligns with the parallel lines at the two alignment positions on the alignment protractor. Once satisfied, tighten cartridge mounting screws firmly and re-check to ensure the cartridge has not moved.

Note: When the HTA alignment process is completed, remember to re-check the tracking force of the tonearm as any movement of the cartridge, forwards or backwards will likely change the tracking force.

Vertical Tracking Angle (VTA)

The Vertical Tracking Angle is a critical adjustment for a good sound. VTA or vertical tracking is the front-to-rear rake of the stylus within the groove and is controlled by raising or lowering the pivot end of the tonearm. The tonearm VTA should match the angle of the cutter head used on mastering the original record. Raising the VTA will have the effect of sharpening up or focusing the sound while inversley, lowering the VTA will likely give a richer, rounder sound. These adjustments are subjective.

To adjust the vertical tracking angle of the arm, first loosen the locking screw on the side of the mounting bush. Then turn the vertical adjustment screw located next to the bearing housing. Clockwise to raise the tonearm and counter clockwise to lower the tonearm. One complete turn will raise or lower the arm by 0.7mm. Once the adjustment has been made be sure to secure the tonearm again by re-tightening the locking screw on the side of the mounting bush.

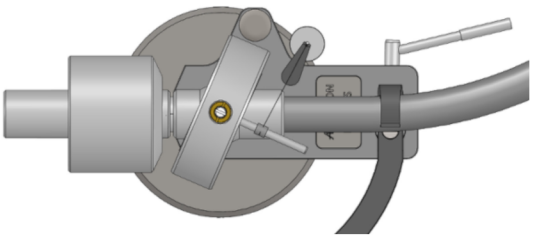
CAUTION: You should **NOT** attempt to adjust the VTA while playing a record or with the cartridge stylus on a record. All adjustments must be made with the tonearm secured within the tonearm rest.

After each VTA adjustment the tonearm may be carefully cued on to a stationary record to enable the underside to the head shell to be checked as being parallel to the record surface.

Bias / Antiskate Adjustment

The bias, or anti-skate, is a force applied in such a way as to counteract the inward pull created by the friction between the cartridge stylus and the record groove acting at the cartridge offset angle.

The bias / anti-skate weight is the hanging weight located towards the rear of the tonearm, to the front of the gimbal rings – see diagram.



The loop in the bias thread is held between the two silicone sleeves, enabling infinite adjustment between minimum and maximum bias force. See diagram above. Adjustment of the bias force is achieved by moving the two bias sleeves together along the bias arm. The further away from the gimbal rings and bearings, the greater the applied bias force.
The bias force required varies according to type of stylus and between records.

Bias / Antiskate Adjustment

As a guide, measured at the cartridge stylus. For the 9 inch tonearm, the closest position to the bearing applies 0.2g of bias and the position furthest away from the bearing applies 0.5g of bias. For the 10.5 inch tonearm, the closest position to the bearing applies 0.17g of bias and the position furthest away from the bearing applies 0.43g of bias. For the 12 inch tonearm, the closest position to the bearing applies 0.15g of bias and the position furthest away from the bearing applies 0.38g of bias.

You can use a test record to verify the proper anti-skate. A test record contains signals recorded that can help you adjust or assess different aspects of your turntable. In the case of anti-skate, one signal is present for each of the channels. When you play this track, both channels should sound clean and to the highest level. Distortions and differences in intensity are signs of incorrect anti-skate setup. You can adjust your anti-skate until the sound is clear and the level is balanced. You can listen to the track or use an oscilloscope for analysing the signals.

Some people use a blank vinyl record. This is a record without grooves, it has a flat surface with no music. In this case, you place the stylus in the middle of the record. If the stylus maintains its place during playback, then the bias / anti-skate is setup properly. If the stylus skates towards either the centre or the edge of the record, your bias / anti-skate needs to be adjusted. This technique gives a basic approximation to correct bias, however, the skate force is higher on a grooved record than on a flat surface due to the forces generated by tracking the undulating groove.

Cue Height Adjustment

The cue device may be adjusted by means of the lockscrew which is accessible through the orifice on the right hand side of the cue support platform. A hexagon wrench is provided for this adjustment.

Warranty

Both the craftsmanship and the performance of the products supplied by Alphason Specialist Audio are covered by a five year manufacturer's warranty against manufacturing defects. This warranty is non-transferable. If a product develops a defect during warranty period, you should follow the Alphason Specialist Audio returns procedure. Full details of the warranty and returns procedure can be found on the website.

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HR-200S : 9" (229mm effective length)

Effective Length 229.000mm (bearing centre to stylus)
Angular Offset 24.083 degrees
Stylus Overhang 18.654mm
Pivot to Spindle 210.346mm
Using the Lofgren "B" Alignment calculation, maximum % distortion between null points of 0.447%
Average % RMS Distortion of 0.386%
Effective Mass (Standard counterweight close to bearings, finger grip & screws) 10.2g
Effective Mass, without finger grip & screws 9.5g
Bias Weight 5.35g
Bias string length (top of weight to centre of pin) 58mm + or -3mm
Minimum bias force (bias sleeve up against inner ring), 0.2g measured at the cartridge stylus
Maximum bias force (bias sleeve furthest away from inner ring), 0.5g measured at the cartridge stylus

Standard Counterweight, 31.2 dia x 28mm. One turn adds 0.25g to tracking weight. Maximum cartridge mass 12.5g
Intermediate Counterweight, 35.6 dia x 25.5mm. One turn adds 0.375g to tracking weight. Cartridge mass 5.5g to 22g
Large Counterweight, 41.5 dia x 25.5mm. One turn adds 0.50g to tracking weight. Cartridge mass 12.5g to 36g

HR-200S (9")

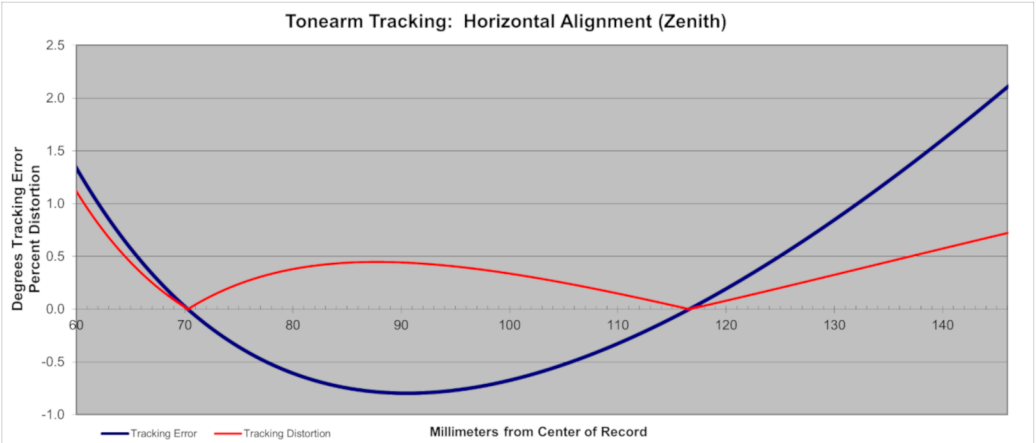

Tonearm Tracking: Horizontal Alignment (Zenith)
Degrees Tracking Error
Percent Distortion
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
60
70
80
90
100
110
120
130
140
Tracking Error
Tracking Distortion
Millimeters from Center of Record

Chart to predict resonant frequency of HR-200S 9" tonearm with a range of cartridge mass and cartridge cantilever compliance.

Optimum frequency is considered to be between 7Hz and 12Hz, although 6.5Hz to 14Hz may be acceptable. Head shell weights are available to increase the effective mass, which is equivalent to increasing the cartridge mass. A damping trough is available to critically damp this phenomenon.

Cartridge Mass (g)	Compliance to give 6.5Hz	Compliance to give 7Hz	Compliance to give 12Hz	Compliance to give 14Hz
5	37.7	32.5	11.1	8.1
6	35.9	31.0	10.5	7.7
7	33.9	29.2	9.9	7.3
8	32.1	27.6	9.4	6.9
9	30.4	26.2	8.9	6.6
10	29.0	25.0	8.5	6.2
11	27.6	23.8	8.1	6.0
12	26.4	22.8	7.7	5.7
13	25.3	21.8	7.4	5.5
14	24.3	20.9	7.1	5.2
15	23.3	20.1	6.8	5.0

Compliance in um/mN or cm/dyne x 10E-6

Resonance frequency can be calculated by using the formula -

$f = 1000 / (2 \times \pi \times \sqrt{(M \times C)})$

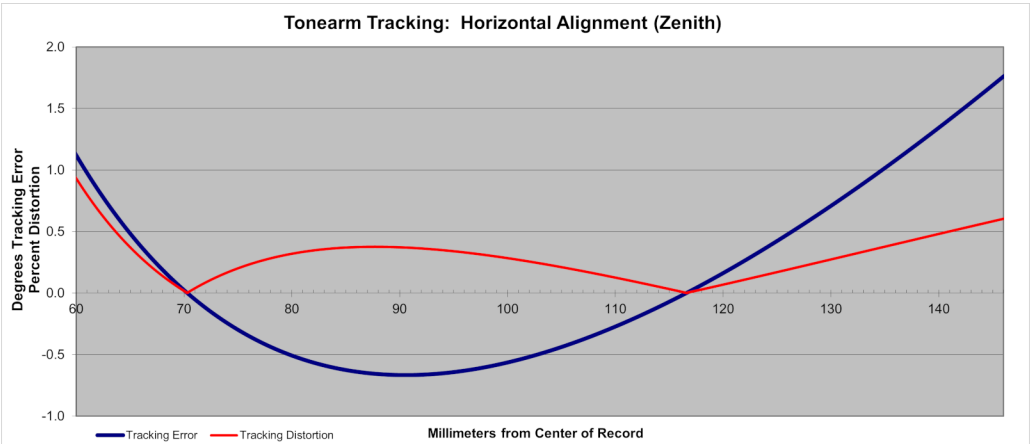
where:
f is Cartridge resonance frequency in Hz
π is 3.14159
C is Cartridge compliance lateral in µm/mN or cm/dyne x 10E-6
M - Total tonearm system mass which is a sum of Mass of cartridge + Mass of head shell and screws and Effective mass of tone arm (all values in gram).

HR-200S-10.5 : 10.5" (266.7mm effective length)

Effective Length 266.700mm (bearing centre to stylus)
Angular Offset 20.510 degrees
Stylus Overhang 15.835mm
Pivot to Spindle 250.865mm
Using the Lofgren "B" Alignment calculation, maximum % distortion between null points of 0.375%
Average % RMS Distortion of 0.323%
Effective Mass (Standard counterweight close to bearings, finger grip & screws) 11.7g
Effective Mass, without finger grip & screws 10.9g
Bias Weight 5.35g
Bias string length (top of weight to centre of pin) 58mm + or -3mm
Minimum bias force (bias sleeve up against inner ring), 0.17g measured at the cartridge stylus
Maximum bias force (bias sleeve furthest away from inner ring), 0.43g measured at the cartridge stylus

Standard Counterweight, 10.5" tonearm, 40.3 dia x 28mm. One turn adds 0.4g to tracking weight.
Cartridge mass 5.5g to 24g
Large Counterweight, 10.5" tonearm, 44.3 dia x 28.5mm. One turn adds 0.5g to tracking weight.
Cartridge mass 10g to 33g

HR-200S-10.5 (10.5")



Note: The distortion figures for a 10.5" tonearm drop to 0.375% between null points and 0.323% RMS ie a 16.5% reduction in distortion over the 9" tonearm.

Chart to predict resonant frequency of HR-200S 10.5" tonearm with a range of cartridge mass and cartridge cantilever compliance.

Optimum frequency is between 7Hz and 12Hz, although 6.5Hz to 14Hz may be acceptable. Head shell weights are available to increase the effective mass, which is equivalent to increasing the cartridge mass. A damping trough is available to critically damp this phenomenon.

Cartridge Mass (g)	Compliance to give 6.5Hz	Compliance to give 7Hz	Compliance to give 12Hz	Compliance to give 14Hz
5	34.5	29.7	10.1	7.4
6	32.9	28.4	9.7	7.1
7	31.2	26.9	9.2	6.7
8	29.7	25.6	8.7	6.4
9	28.3	24.4	8.3	6.1
10	27.0	23.3	7.9	5.8
11	25.8	22.3	7.6	5.6
12	24.8	21.4	7.3	5.3
13	23.8	20.5	7.0	5.1
14	22.9	19.7	6.7	4.9
15	22.0	19.0	6.5	4.8

Compliance in um/mN or cm/dyne x 10E-6

Resonance frequency can be calculated by using the formula -

$f = 1000 / (2 \times \pi \times \sqrt{(M \times C)})$

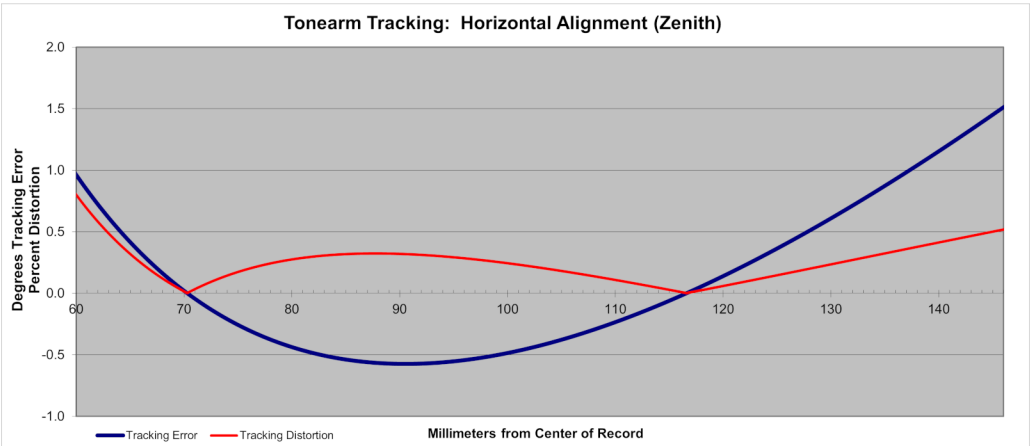
where:
f is Cartridge resonance frequency in Hz
π is 3.14159
C is Cartridge compliance lateral in µm/mN or cm/dyne x 10E-6
M - Total tonearm system mass which is a sum of Mass of cartridge + Mass of head shell and screws and Effective mass of tone arm (all values in gram).

HR-200S-12 : 12" (305mm effective length)

Effective Length 305.000mm (bearing centre to stylus)
Angular Offset 17.841 degrees
Stylus Overhang 13.745mm
Pivot to Spindle 291.255mm
Using the Lofgren "B" Alignment calculation this results in a maximum % distortion between null points of 0.322%
Average % RMS Distortion of 0.278%
Effective Mass (Standard counterweight close to bearings, finger grip & screws) 12.1g
Effective Mass, without finger grip & screws 11.3g
Bias Weight 5.5g
Bias string length (top of weight to centre of pin) 58mm + or -3mm
Minimum bias force (bias sleeve up against inner ring), 0.15g measured at the cartridge stylus
Maximum bias force (bias sleeve furthest away from inner ring), 0.38g measured at the cartridge stylus

Standard Counterweight, 12" tonearm, 42.9 dia x 28mm. One turn adds 0.4g to tracking weight. Cartridge mass 2.5g to 20g
Large Counterweight, 12" tonearm, 47.7 dia x 28mm. One turn adds 0.5g to tracking weight. Cartridge mass 8.0g to 31g

HR-200S-12 (12")



Note: The distortion figures for a 12" tonearm drop to 0.322% between null points and 0.278% RMS ie a 28% reduction in distortion over the 9" tonearm.

Chart to predict resonant frequency of HR-200S 12" tonearm with a range of cartridge mass and cartridge cantilever compliance.

Optimum frequency is between 7Hz and 12Hz, although 6.5Hz to 14Hz may be acceptable. Head shell weights are available to increase the effective mass, which is equivalent to increasing the cartridge mass. A damping trough is available to critically damp this phenomenon.

Cartridge Mass (g)	Compliance to give 6.5Hz	Compliance to give 7Hz	Compliance to give 12Hz	Compliance to give 14Hz
5	32.6	28.1	9.6	7.0
6	31.2	26.9	9.2	6.7
7	29.7	25.6	8.7	6.4
8	28.3	24.4	8.3	6.1
9	27.0	23.3	7.9	5.8
10	25.8	22.3	7.6	5.6
11	24.8	21.4	7.3	5.3
12	23.8	25.0	7.0	5.1
13	22.9	19.7	6.7	4.9
14	22.0	19.0	6.5	4.8
15	21.3	18.3	6.2	4.6

Compliance in um/mN or cm/dyne x 10E-6

Resonance frequency can be calculated by using the formula -

$f = 1000 / (2 \times \pi \times \sqrt{(M \times C)})$

where:
f is Cartridge resonance frequency in Hz
π is 3.14159
C is Cartridge compliance lateral in µm/mN or cm/dyne x 10E-6
M - Total tonearm system mass which is a sum of Mass of cartridge + Mass of head shell and screws and Effective mass of tone arm (all values in gram).

Notes

Notes