KUZMA 4POINT 9 TONEARM

Instruction manual Serial Number: …..

2019-09

KUZMA LTD
INSTRUCTION MANUAL FOR 4POINT 9 tonearm

The **4POINT 9** tonearm is a very precisely engineered piece of equipment, however, the construction is robust and requires minimal maintenance for optimal performance.

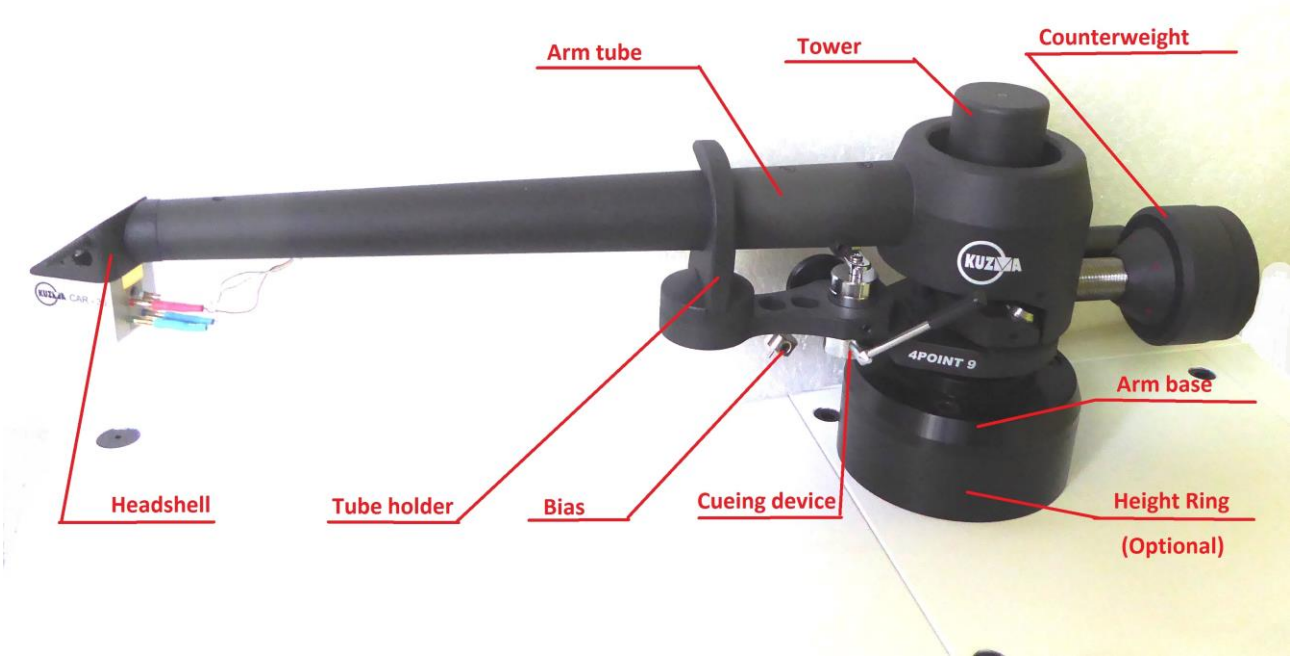

Fig. 1. General parts and features

CONTENTS:

General description

The Kuzma 4Point 9 tonearm is similar in construction to the 4Point tonearm with the same 4 point bearing configuration.
We made this tonearm shorter (9 inch) than the existing arm 4Point (11 inch) and lighter by omitting the VTA tower enabling 4Point tonearm quality to be experienced on a greater number of turntables with smaller footprint or lighter suspension, etc.

The heart of the bearing construction is a unique 4 point bearing. The first set of two points (similar to a double unipivot bearing) allows vertical movement. The second set of two points allows horizontal movement. All four points have minimal starting and moving friction and zero play in all playing directions thus ensuring that headshell with the cartridge itself moves precisely and with minimal vibration across the record. It would be normal to feel slack in the bearings in certain directions.

The main tube is constructed and machined from solid aluminium, similar to our tangential Air Line arm. The counterweight with lock mechanism balances the tonearm. Azimuth can be adjusted in small repeatable increments with zero play, by means of an Allen key.

A feature of the tonearm is a unique detachable headshell. The electrical connection is via standard clips but the headshell can be simply removed by unscrewing with an Allen key. The headshell is fixed with a precise hexagonal locking system giving the same rigidity as with a fixed headshell.

The tonearm is fixed on the turntable arm board via the Kuzma arm base. VTA is adjusted by raising or lowering the tonearm's pillar in the arm base by a VTA screw which controls its height, thus still allowing precise VTA changes when required.

Internal wiring is of superior special alloy silver wires. A set of 4 wires runs unbroken from the cartridge pins via a 1.5 m long tonearm cable with silver RCA bullet connectors.

Product registration and warranty extension

Kuzma products have a non transferable 2 year limited warranty on parts and labour, which may vary in each country.
To obtain the 5 year* limited warranty from us, you need to register the product on our web site within 30 days of purchase. We suggest registration of products in any case because this will also help you to receive our technical support more easily and with resale of products.
Simply register on our web site, complete the forms and you will receive an extended five year warranty card on your email within a few days. * not valid for ex demo products.

Technical data:

Mass:	920 gr
Effective length :	229 mm (9 inch)
Mounting distance:	212 mm
Offset angle:	23 deg
Effective mass:	13 g
VTA adjustment:	yes
Azimuth adjustment:	yes
Bias adjustment:	yes
Detachable headshell:	yes
Cables:	silver
Arm mount:	Kuzma arm base 212 mm
Accessories:	
Allen key 1,5 mm	bias, cueing device
Allen screwdriver 1,5 mm	VTA
Allen key 2,0 mm	azimuth, headshell
Allen T key 2,5 mm	lock in arm base
Allen key 4,0 mm	arm base
VTA rings	2x (5&20 mm)
Optional:	extra headshells, height ring

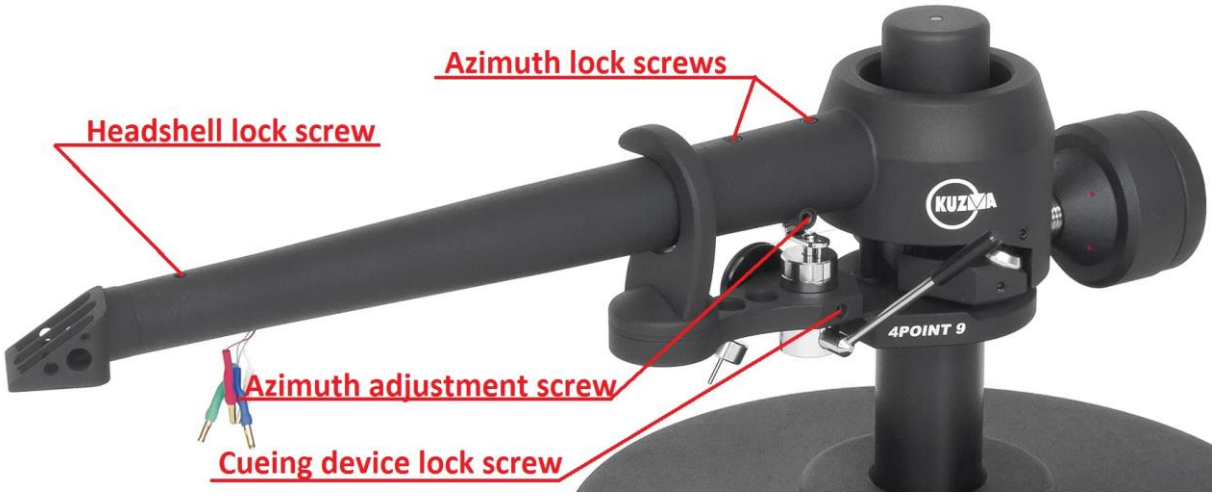

Fig. 2. Various screws for adjustments- lift side

1. Unpacking

Open the box carefully and remove top covers.
The tube with vertical bearing points is packed separately (tube assembly) on the top of the box. Please do handle with care and when put aside, ensure that nothing is touching the bearing points. Bear in mind how you will handle it with the output cable which is fixed on the tube assembly during transport.

First remove the arm base and prepare it for fixing onto the turntable. Be sure that the arm board on the turntable has the correct cut-out (main central hole must be 40 mm in diameter and pivot to spindle distance is 212 mm).

Remark:
The arm tower with horizontal bearing is blocked during transport by protective foam. (See Fig. 6&16) When tonearm is transported remove tube assembly, gently lifting top of the arm tower and reinserting foam!

2. Basic set up

Arm base:
Mount the arm base on the turntable at a distance of 212 mm from spindle! If the pre-cut arm board has a thread (M5), then use three screws and fix them from the top through the arm base into the arm board thread, or use a ring underneath and fix three screws into this ring, which will then hold the arm base very tightly. Ensure that you position the arm base so as to give access to an Allen key for fixing the arm tower into the arm base i.e. towards the rear right back corner of the turntable. Also check, when mounting the arm on other turntables, that you allow enough clearance for the counterweight and correct position of the tube in relationship to the platter. (Fig. 3&4)
Due to the special bearing construction, there is only a limited arc in which the arm tube can travel in a horizontal way.

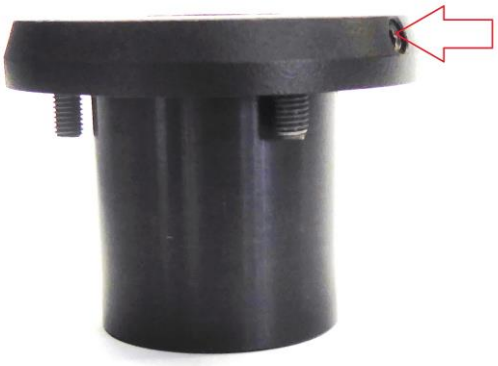

Fig. 3. Kuzma arm base

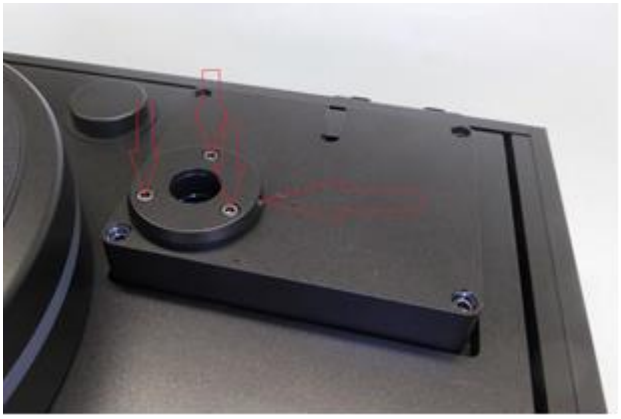

Fig. 4. Arm base on arm board

Arm tower:
Insert the arm tower into the arm base. Ensure that the height is such, that the top surface of the platform holding the cueing device is at a similar height to the record. Fix it with an Allen key in the arm base. Also check that the VTA screw is allows you to keep the tower at the chosen height.
(Fig. 5&5a)

Fig. 5. Arm tower- various adjustments

Fig. 5a. Arm tower locking in arm base

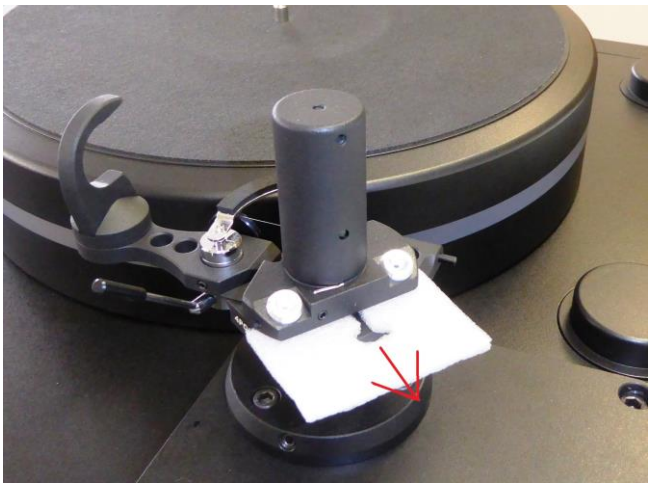

Fig. 6. Arm tower-removing bearing protection foam

Remove the fixing foam on the horizontal bearing assembly (Fig. 6). Check that the bias thread is fixed and gently rotate the horizontal bearing assembly from one to another extreme. It is only possible to make approximately ¼ of a turn and it is normal to feel slack in the bearings.

Tube assembly:

Carefully take the tube assembly with the cable and gently position it around the horizontal bearing assembly so that **both** vertical spikes (points) fit into the appropriate vertical bearing cups. Then position the tube into the armrest. (Fig. 7&7a)

Fig. 7. Tube with cable

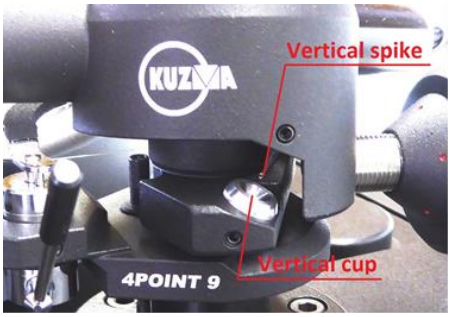

Fig. 7a. Vertical bearing spike & cup.

Cable assembly:

Remove cable from the tube assembly by releasing the black cable holder from the transport position with the 1.5 mm Allen key. Fix it to the empty pin at the back of the arm tower. Fix it in such way, that the wires will go upwards towards the tube in a loop . Be sure, that the arm tower is fixed in the arm base, because the weight of the cable might otherwise rotate it. (Fig. 8&8a)

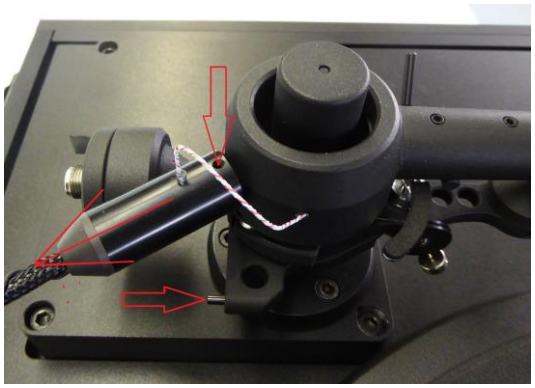

Fig. 8. Cable in transport position

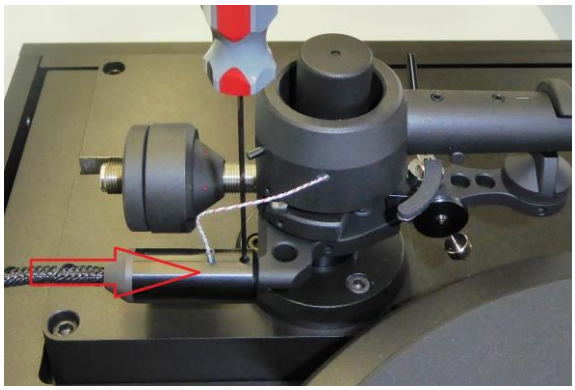

Fig. 8a. Cable in play position

3. Setting up the tonearm:

Remark:

On our web site look for KAA 2016 download (Kuzma Analogue Academy 2016) where you will find theoretical and practical information how to optimally set up tonearm and cartridge!

Connecting tonearm:

Check the horizontal movement of the tube to ensure that the headshell will reach the inner grooves (approximately to the edge of record label), but will not travel to the centre of the record due bearing construction. Connect the tonearm cable and ground wire into the phono preamp.

Due to the added mass of the tonearm, turntable levelling and suspension should be checked and adjusted according to the turntable manual.

Cartridge mounting:

Mount the cartridge with the appropriate set of M 2.5 mm screws. When fixing cartridge clips be sure that you do not damage wires under the insulation tubes! If you wish you can fix the fingerlift on the side of the headshell- no key required.(Fig. 9d)

Headshell removal and fixing:

This tonearm has a detachable headshell and fixing and positioning it has no negative effect on tonearm performance. The whole headshell is fixed with one Allen key 2 mm. (Fig. 9a-c)

Insert Allen key in the hole on top of the tube and release screw for at least one turn (ACW). (Fig. 9b)
Disconnect cartridge clips, remove Allen key and pull out the headshell. (Fig. 9c)

Fix the cartridge on the headshell and reinsert headshell back into the tube. If it can not be inserted easily, rotate the screw a little more in ACW direction. Then fix headshell into the tube, rotate the screw in a CW direction with gentle force, about one turn.

Fig. 9a. Locked

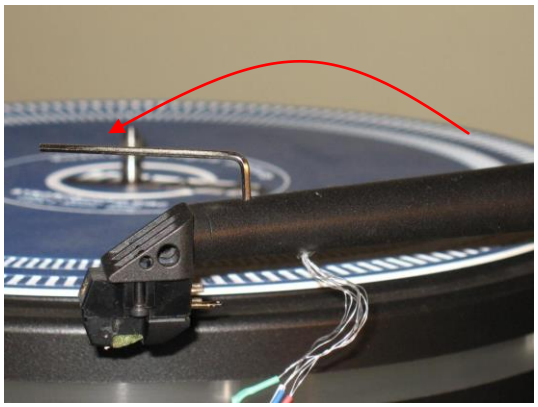

Fig. 9b. Unlocked

Note: Do not over-tighten the screw which locks the headshell.

Fig. 9c. Removing headshell

Fig. 9d. Headshell's fingerlift

Balancing of the tonearm:
Fix cartridge clips. Rotate the counterweight and aim for roughly zero balance.

The tonearm's centre of gravity is chosen to be around the height of vertical rotation, therefore balancing the tonearm to zero is very difficult. Adjust it to be roughly balanced and increase tracking force by counterweight rotation.
If the counterweight is too loose, hold the front part of the counterweight and rotate the rear part until there is a tighter fit, or lock it into position on the threaded carrier. Opposite rotation will make the counterweight looser. (Fig. 10)

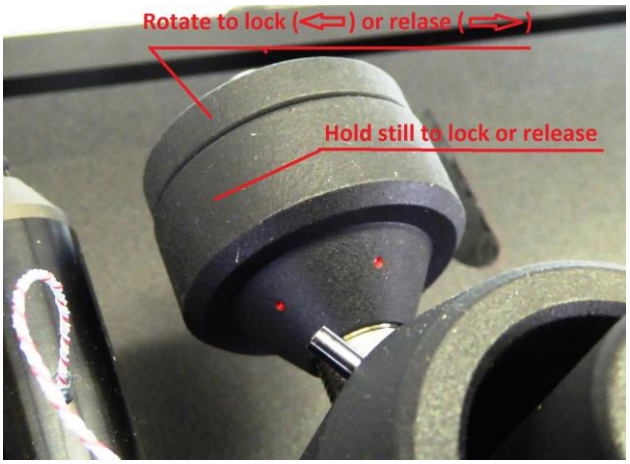

Fig. 10. Counterweight

4. Tracking force

Set tracking force by using a balancing scale, which must be at record height. Rotate the counterweight towards the tube. Rotation for one dots will change tracking force by approximately 0.15 g. Set the tracking force suggested by cartridge data.
Check that the cueing device is at the correct height (See Paragraph 9).

5. Tangential geometry set up

Put a record on the platter, cue cartridge, lift up cartridge from the record and adjust height of the arm tower in such a way, that the central axis of the tube will be parallel to the record. If you cannot move the arm tower down, check VTA screw. (See Paragraph 6)

Using the protractor, adjust geometry at two null points. Rough guidance is given by the edges of the cartridge body, but accurate adjustment is by observing whether the cantilever and lines are parallel at the two null (zero) points or by special single null point protractors. (Fig. 11)
See Appendix 1.

Fig. 11. Pivot point

6. VTA adjustment (height)

Set up VTA on this tonearm by releasing the screw in arm base. The VTA screw will prevent the tonearm dropping down after the locking screw in the arm base is released.

Fig. 12. Adjusting VTA screw

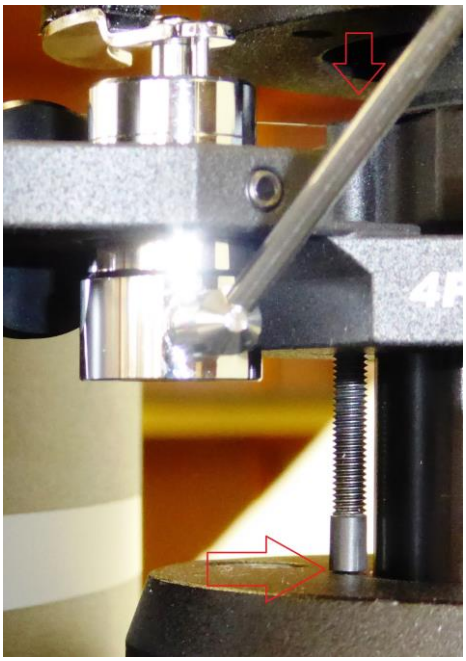

Fig. 12a. VTA screw on arm base

One screw rotation changes VTA for 0.5 mm. The VTA screw range is in the range of 30 mm. If you need to have tonearm VTA adjustment higher, then add the black VTA ring between the arm base and VTA screw. This will give you an extra 5 mm or 20 mm height. You will find them with the accessories. See Fig. 12b&12c. Thinner VTA ring you do not fix on pillar with screw!
If you find out that tonearm is positioned too low below the platter you can purchase plastic height ring to be fitted below arm base. That will raise the arm for about 20 mm. See Fig.1.

Fig. 12b. Black metal ring- optional

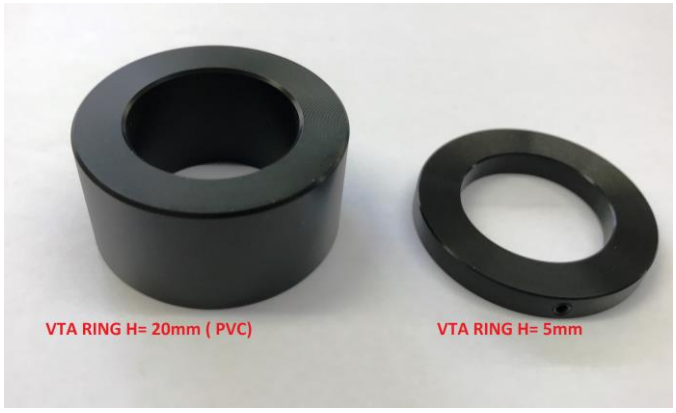

Fig. 12b. VTA rings

You might find that extreme VTA height cause problems with the cueing device height (See Paragraph 9).

In some extreme VTA situations the tube arm rest height can be readjusted. Release the tube lock screw and pull up arm rest. (Fig. 5&13) You will notice that below the arm rest is thin plastic plate. This can be either removed, thus lowering arm rest height, or another added to raise it. You will find a small spare thin black PVC plate with the accessories.

Fig. 13. Arm rest plate

Fig. 13a. Arm rest one spacer plate

7. Azimuth adjustment

To make azimuth adjustments, release the two screws locking the mechanism on the centre top of the tonearm tube, with Allen key 2mm. Under the main tube is a tiny rod with a hexagonal screw. Insert the Allen key 2 mm into the screw (it may feel loose), rotate it slightly and it will alter the azimuth. (Fig. 2 &14a-d) **See Appendix 2.**

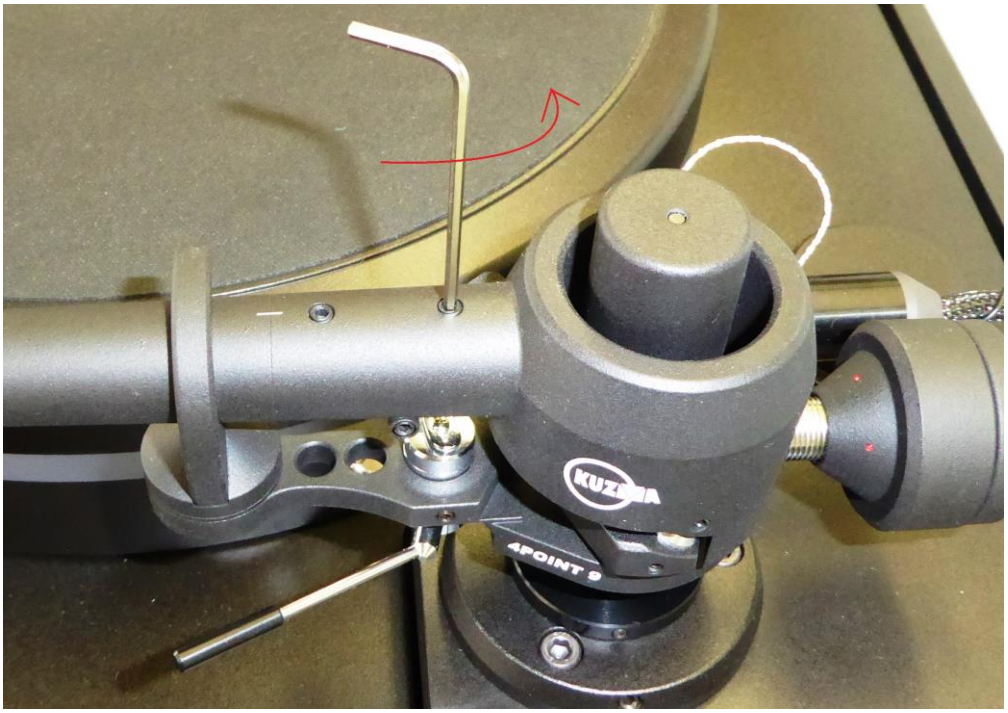

Fig. 14a. Azimuth adjustment-unlocking

Rotating Allen key back will return azimuth to its previous position. Changes can be seen by misalignment of the white lines on the top of the centre of the tube.

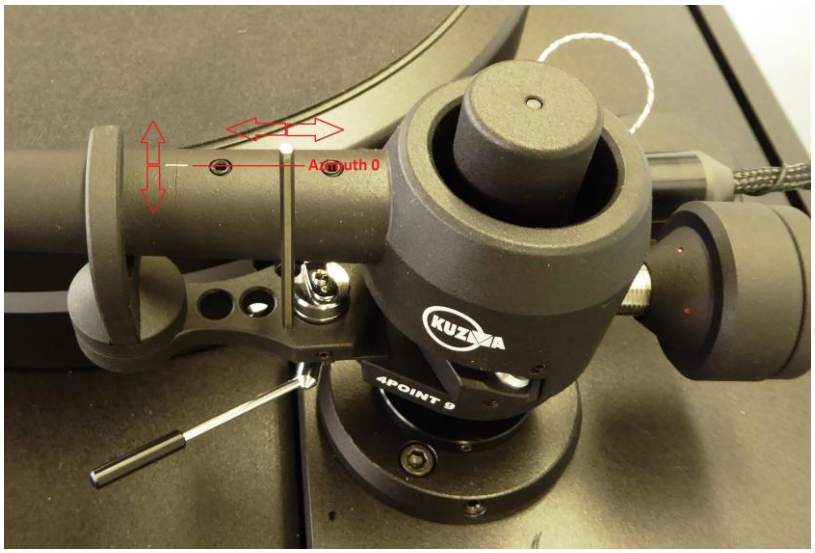

Fig.14b. Azimuth 0°

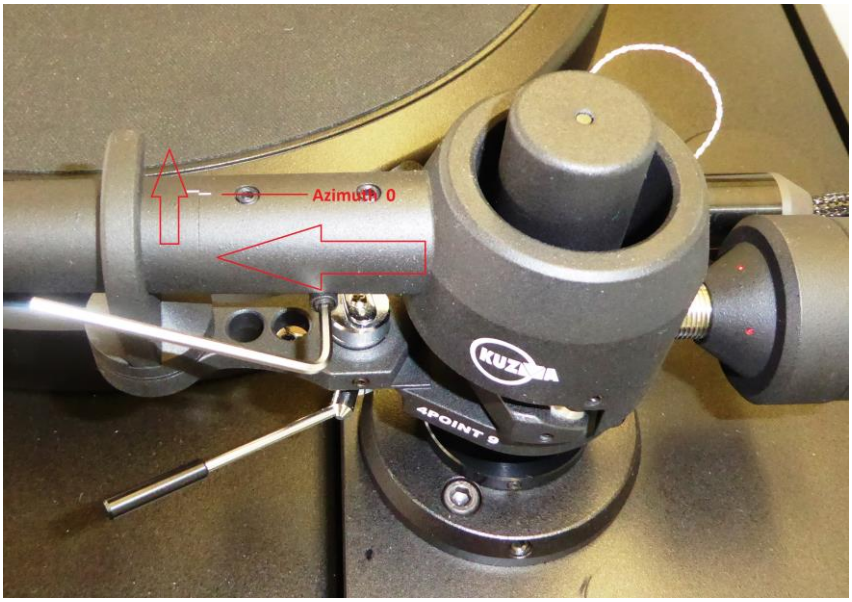

Fig. 14c. Azimuth left

Fig. 14d. Azimuth right

8. Bias adjustment:

The bias should be adjusted roughly according to the tracking force. Using Allen key 1.5 mm, unlock the screw on the bias weight and position it to the equivalent of gap X of your chosen tracking force. Lock the screw back, when in position. (Fig. 15)

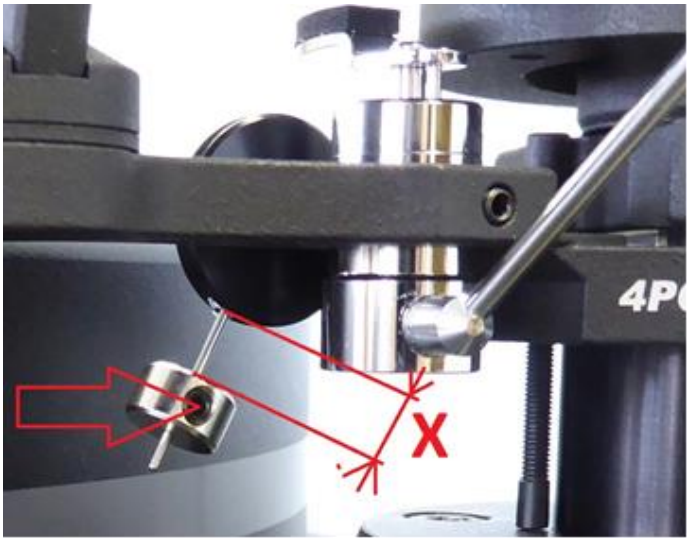

Fig. 15. Bias adjustment X distance

X	P
mm	gr
0	1.00
4	1.50
8	2.00
10	2.25
12	2.50

For maximum tracking, it is advisable to set the bias by use of an appropriate test record, ie. those with tracking bands. Please do not use test records with blank space where the tip of the needle sits on the surface rather than in the groove.
See Appendix 3.

9. Cueing device adjustment

Should you find that in the 'up' position the cartridge is too high or too low above the record then the cueing device can be raised or lowered. This can be done simply by using Allen key 1.5 mm:
-Insert key into screw on side of arm rest.
-Release screw, raise or lower device and retighten.
-Rotation of the cueing device may affect the drift of the cartridge while travel vertically down.

The cueing device may lift slightly as the screw is retightened. Do not over-tighten as this may cause the cueing device to stick in the 'up' position. Should this occur, slightly release the screw. (Fig. 2)

10. Maintenance

The bearing does not need maintenance. Clean dust from the tonearm with a dry soft cloth or brush.

11. Transport

During transport the tube assembly must be removed from the arm tower and reposition the cable on the tube assembly.(Fig. 8&16)

Remark: Return fixing foam below the horizontal bearing tower assembly prior to transport!

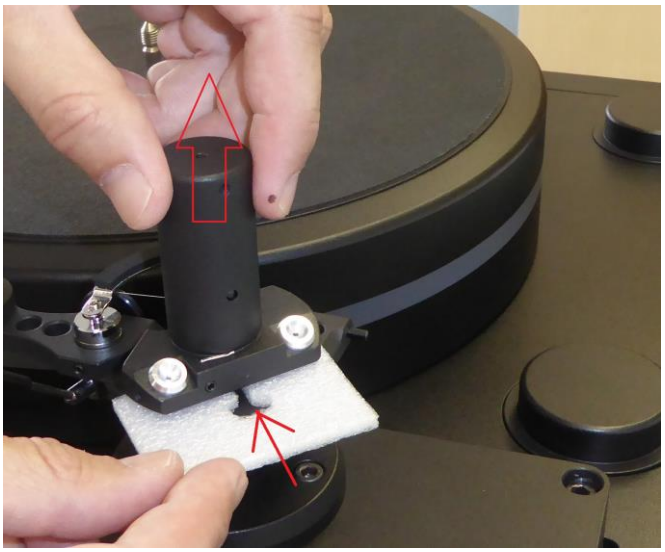
Fig. 16. Blocking arm tower with foam

If you transport a turntable with the tonearm in place, ensure that hard vibration from the car does not transmit directly to the tonearm. Placing soft material such as rubber, foam or a thick blanket below the turntable is helpful in filtering rough vibrations even when the platter is removed.

12. Troubleshooting

- Cartridge is not reaching inner grooves: check that the position of the tonearm is correct with a protractor for distance and that the spindle to arm base distance is 212 mm. Otherwise you need to rotate arm tower.

- Headshell cannot be removed- check that the screw is adequately released with Allen key. (Fig. 10c)

- Headshell identification: Different length 4Points use different headshells due to different offset angles. 4Point 9 is marked with 3 holes. (Fig. 17)


Fig. 17. 4Point 9 headshell-3holes

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APPENDIX 1

Tangential Cartridge geometry adjustment

Once the cartridge has been mounted, it is necessary to ensure that the cartridge is tangential to the record grooves in order to minimize tracking distortion during playing. As the cartridge moves in an arc across the record, tracking distortion occurs and is minimized by the tonearm geometry and the angle of the cartridge in the headshell.

With optimum tonearm geometry, very low distortion levels (below 1 %) can be obtained across the entire playing surface. Cartridges have zero distortion at two points on a record and these points are used when aligning the cartridge. In practice these points lie at 66 mm and 121 mm from the record centre (see protractor). Other protractors make use of different zero points due to the use of different parameters in calculation. In this case 60 mm has been chosen as the inner groove and 146 mm as the outer groove which still has optimum tracking distortion.

1. Ensure bias is on minimum or switch off.
2. Place protractor over spindle on platter.

Note:
If you have difficulty seeing the cantilever it may help to raise the arm a few mm, taking care that the protractor does not rotate. This also prevents tilting of the cantilever due to the effect of bias force. It may also be helpful to fix the platter by inserting a wedge between platter and plinth and by inserting a sheet of white paper to give a clear background while observing the cartridge. Use a strong light.

3. Alignment at zero point 66 mm (A):
Place tip of stylus on point A (ie. zero point 66 mm). With a strong light observe cartridge from front. The cantilever and the line on protractor should be in perfect alignment.
If the cantilever is not, then the body of the cartridge will have to be rotated slightly.
Do not adjust cartridge by observing body of cartridge only. (Fig.14)

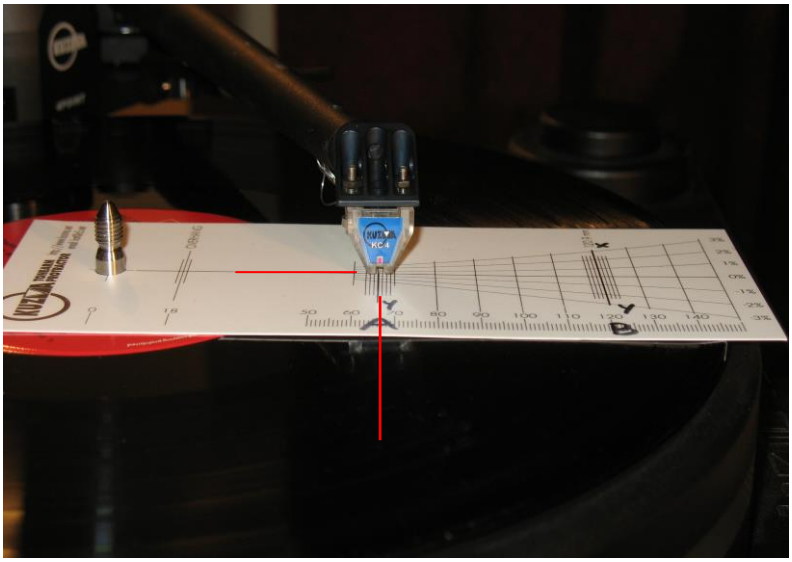


Fig. 14 Alignment at A

To rotate or readjust cartridge:
4. Slightly loosen the screws which attach the cartridge to the headshell.
5. Holding headshell in one hand slightly rotate the body of the cartridge.

6. Recheck alignment at position A and continue adjustment until line described in point 3 is achieved.

7. Alignment at zero point 121 mm (B):

Reposition protractor and check alignment at position B.

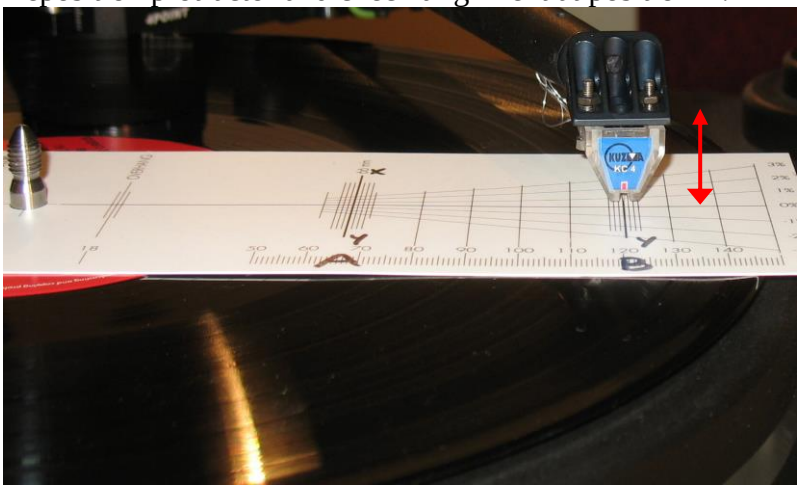


Fig. 15 Alignment at B

8. If the cantilever is not in alignment then rotate protractor until it is in alignment somewhere along the line "x-y" though stylus will probably not be at zero point B. Raise the cueing device a bit for better viewing. (Fig.15)

9. If stylus is in front of point B, pull the cartridge forward (along side) in the slots of the headshell for approximately the same distance "S" as stylus is overhanging zero point B. If it is behind point B, push cartridge backwards towards the pivots of the tonearm for distance "S" (Fig. 16)

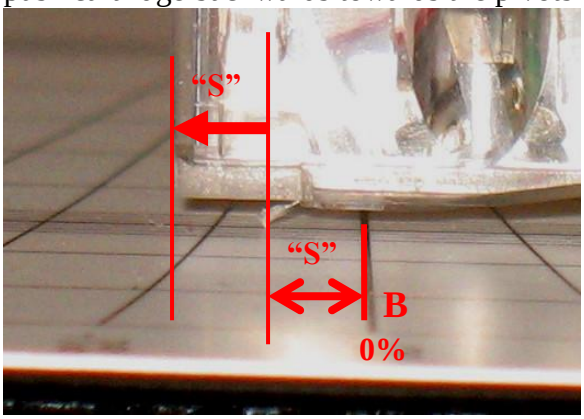


Fig.16 Stylus tip is in front of zero point B.

10. Now rotate protractor and again position stylus at zero point A as described in 5 and 6 above, ensuring that the position of the cartridge in the slots alongside is not changed but only rotated for alignment of the cantilever in zero point A. (Fig.17)

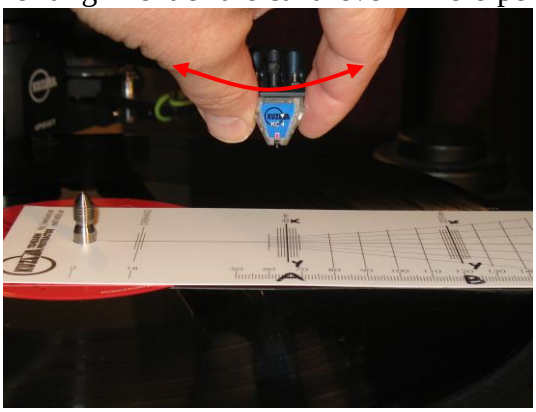


Fig.17 Rotation at A

11. Recheck alignment of the cantilever at zero point B. If cantilever is not aligned here, rotate protractor to find where on line "x- y" the cantilever is aligned again. (Fig.18&15)

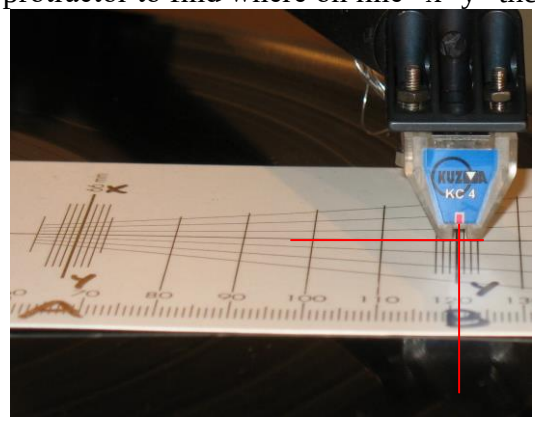


Fig. 18 Alongside line "X-Y" alignment at B

If the stylus is still in front of zero point B on the line "x-y" as before, but nearer to point B, then again pull cartridge slightly forward for distance "S" and repeat the whole process by aligning at zero point A until the stylus will be at zero point B.
If stylus end up behind the zero point B on line "x-y" then move cartridge in opposite direction to before, backwards and realign it at zero point A.
If stylus is still behind the B point, the cartridge should be pushed back and realign at zero point A and realigned again at zero point B.
12. Continue until the stylus is in alignment at both points.

REMEMBER STEPS:
a) Put stylus at zero point A and by rotation align cantilever along XY line.
b) Align cantilever along XY line at zero point B by rotating protractor and see where stylus is on the line XY- in front or behind zero point B.
c) Move cartridge along (not rotating it) for the same distance as stylus is overhanging zero point B for the same distance to increase the overhang.
d) Repeating these steps (a,b,c,a,b,c,…) will ensure that stylus& cantilever are in alignment at both zero points A&B.

<u>NOTE:</u> Ensure that cantilever is not twisted due to bias force.

Appendix 2

Fine Azimuth Adjustment

This can be done using an oscilloscope and a test record or by using good records in a good system and listening to the sound. Cartridges with fine profiles (VDH, Microline etc.) are more sensitive to this adjustment. On the other hand cheaper cartridges are not made so well, making fine adjustment more useful.

With an oscilloscope we measure the differences in crosstalk between both channel. The idea is that on both channels this is equally small. For that we need a test record with tracks recorded for left and right channels separately. Then we compare crosstalk from the left channel on the right channel- which is a very small signal, to the same type of signal from the other channel. By adjusting azimuth, crosstalk on both channels should be made equal.

Listening from LP:
Start listening with the tube in zero position, with the marking lines aligned. Listen to the sound-stage, the focus and the stability of the instruments. Release the two locking screws and rotate the Allen key so that tube rotates for approximately the width of the mark. Listen and then rotate tube for a similar amount in the opposite direction and again listen. Adjust the arm to the position in which the best sound was obtained. In this position make further adjustments by turning the Allen key for a quarter turn in one direction, listening and then turning a quarter turn in the other direction and listening.

Continue this process making ever decreasing adjustments, 1/8 of a turn, then 1/l6 and so on. When optimum results are obtained fix the locking screws. To remember the position of the azimuth, imagine that the inserted Allen key acts as a dial on the clock.

NOTE: During fine adjustment only gently fix locking screws during listening.

The adjustment screw is highly sensitive and the smallest pressure on the Allen key will alter the azimuth and sound.
Do not attempt any adjustment when the locking mechanism is locked. Although no damage can be done.
Significantly improved sound can be obtained by paying attention to azimuth adjustment prior to final VTA adjustment.

Appendix 3

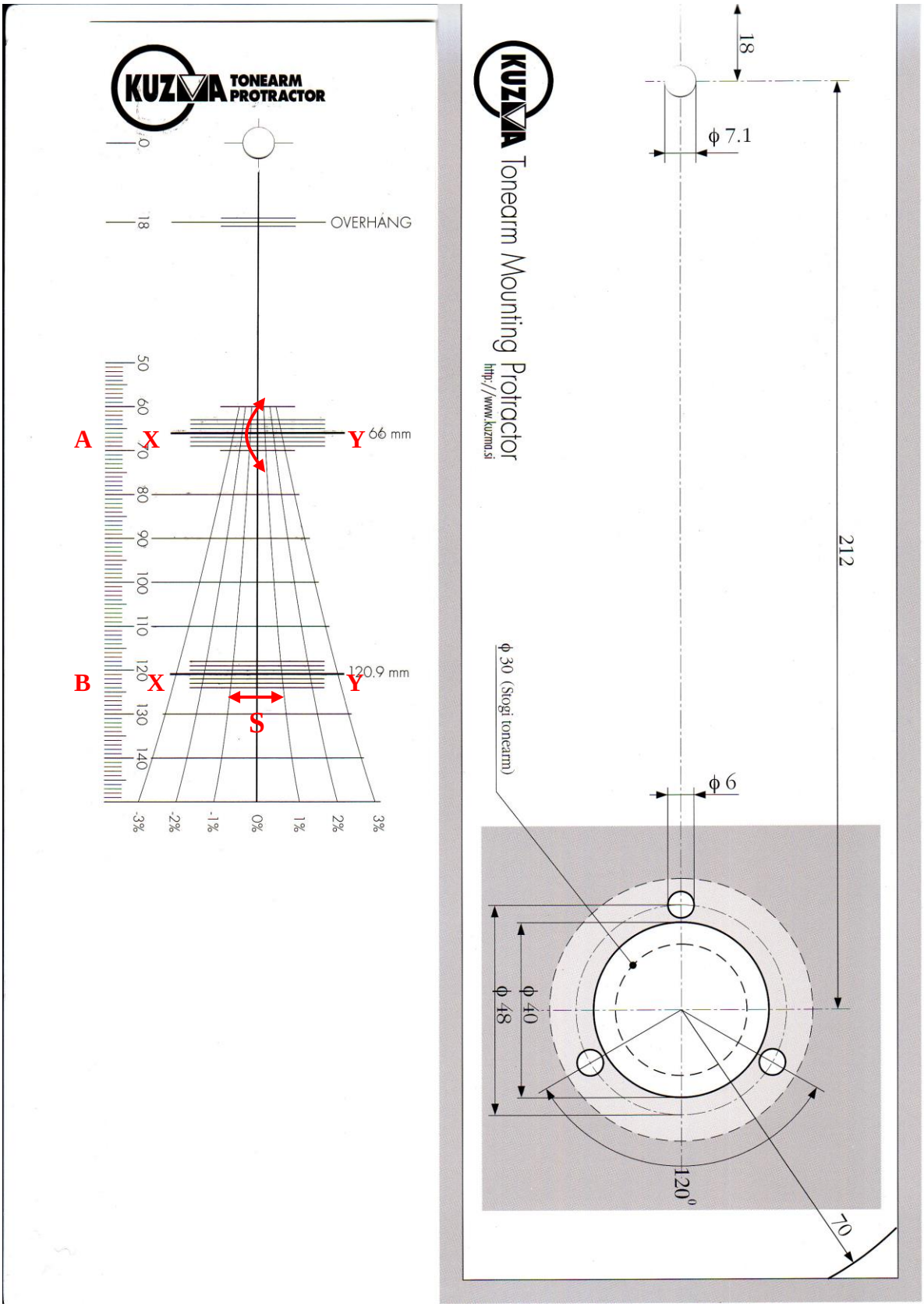
Fine bias adjustment

1. Set bias and tracking force as previously described and listen to mistracking on highly Modulated tracking bands on test record. On higher modulated bands mistracking can be heard as impure tones and there will be more overtones. (See instructions on test record)

2. If mistracking is apparent, increase or decrease bias until minimum mistracking is found. If mistracking is heard on the right channel only then the bias is too low, if on both channels the bias is too high or the trackability limit of the cartridge has been reached.

3. Finally further decrease mistracking by increasing tracking force to the maximum Recommended for the cartridge.

4. It is best to have the highest possible tracking force and low bias force.



Cartridge Protractor (Not in correct scale) Tonearm mounting protractor