KAWAI GRAND PIANO
REGULATION MANUAL

Vol 1.6　2013/1/15

SHIGERU KAWAI　Piano Laboratory

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1. Tighten Plate Screws

The plate will have countersunk screws which should be checked for tightness using ratchet handle with Phillips No. 4 head, or similar. On a new grand piano the screws should be checked carefully, because the bolts are lubricated when installed and can be over-tightened. Even on an older piano we would not expect to get much more than one quarter turn on some of the screws.

For Shigeru Kawai pianos only, plate screws have 2 types. There are hexagonal head screws around the outside, countersunk Phillips screws on the pinblock section. These should be tightened with a 17mm socket for hexagonal screws and Phillips No. 4 head for the countersunk screws, as with the regular Kawai models.
*Note: Shigeru Kawai pianos now use a machine bolt around the rim perimeter. This is threaded into a steel plate support, and should not need to be tightened.

*Some old Kawai pianos use **14mm** screws around outside and a pin block area.

Caution: Do not tighten the nose bolts.

Other case parts such as hinge screws, music desk glide screws, lock bar screws, etc. may be tightened as required.

BE CAREFUL TO NOT OVER TIGHTEN SCREWS. THEY CAN BE OVER-TURNED OR BROKEN.

2. Action Location

Hammer No. 88 should strike the string 2.16mm - 3.0mm from the capo bar. The final location should be chosen by the sound.

To move the action forward glue a shim (thin wood veneer) onto the hard wood block at the back side of the Keyframe. To move the action back, file the wood block. After the block is set correctly, then adjust the keyframe guides in the cheek blocks to match.

If most hammers are aligned towards the left from strings, glue a shim (wood veneer or thick paper) to the back side of Action Block.

3. Ease Keys

3.1 Front hole bushing

While holding the balance rail, check the lateral movement of the keys in the rest (up) position. Also check with the keys in the pressed (down) position. Proper gap should be 0.2 mm to 0.3mm, with a small but clear "knock" sensation.

Easing a tight front hole bushing using key pliers

3.2 Balance hole and balance bushing

Check the lateral movement of the keys in the rest position (up) and in the pressed (down) position.

Ease any tight balance hole bushings with key easing pliers.

Lift up the Key back 1 – 2mm and release. It should fall down slowly by its own weight, without sticking. For best results, key should fall more slowly in humid season, and a little faster during dry season.

If the key sticks then ease the balance hole. This process must be done carefully until the key moves with the desired ease, but is not too loose.
*Do not ease the front and back of the balance rail. Only ease the sides of the hole by turning the easing tool inside the key so that the flat surfaces face front to back, then apply pressure to the hole.

*If the balance hole is loose on the pin, apply a few drops of alcohol and water (Isopropyl 70%) to the hole then set aside. Once it is dry, re-fit it to the pin.

4. Bed Keyframe

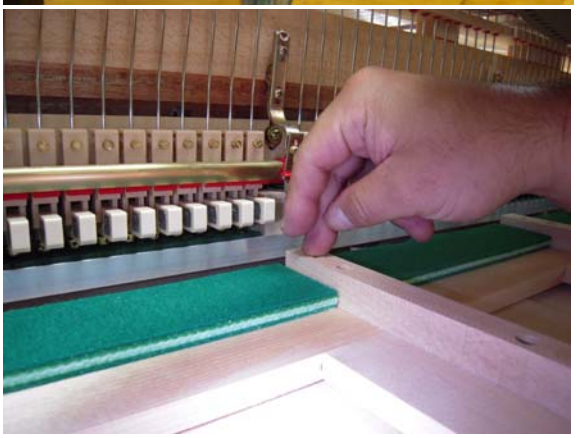
Raise all of the bedding screws so that they are not in contact with the keybed.

Place the fingers of one hand against the front rail and keybed, then tap the keybed with 3 fingers of the other hand. Listen for a knock noise and feel for movement between the front rail and the keybed.

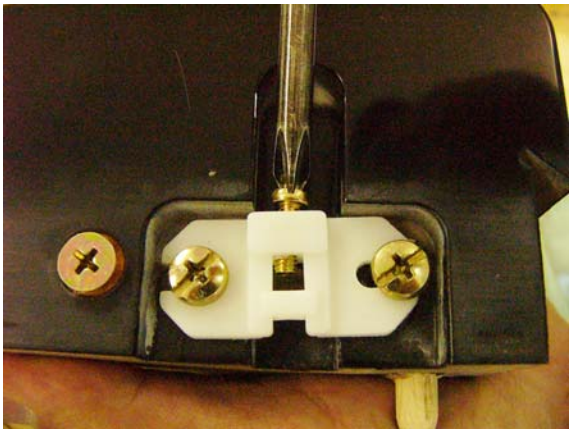
If there are loose areas, pull the keybed out and trim the tight areas with a plane or sanding block. As you remove wood from the tight areas, the loose areas will settle down and become tight

* Note: It is normal for the keyframe front rail to lift up at the ends during dry weather. Be aware of the relative humidity when bedding the keyframe

For the back rail, remove the keys and tap on the action bracket supports to check for knocking. If needed, trim the bottom of the back rail at the tight areas with a hand plane or sanding block, which will lower the loose areas and eliminate knocking.



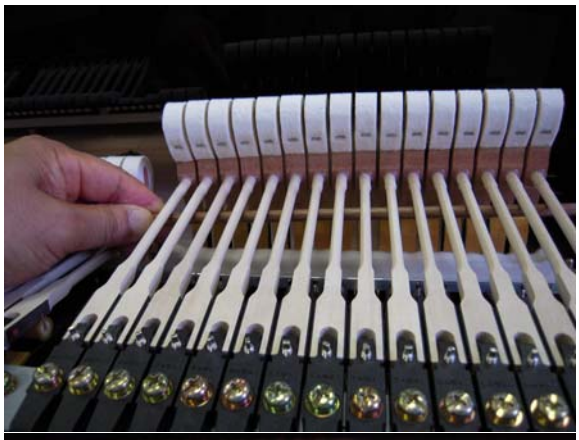
Adjust the pressure screw in the cheekblock for light pressure on the guide pins. This will prevent knocking of the keyframe during dry weather.



*Note: Keep the balance rail bedding screws raised until later in the regulation process. This prevents errors in setting the key height and key dip.

5. Hammer Travel & Angle

Lift a group of hammers by hand or with a straight edge and look for sideways movement as the hammers travel upward.

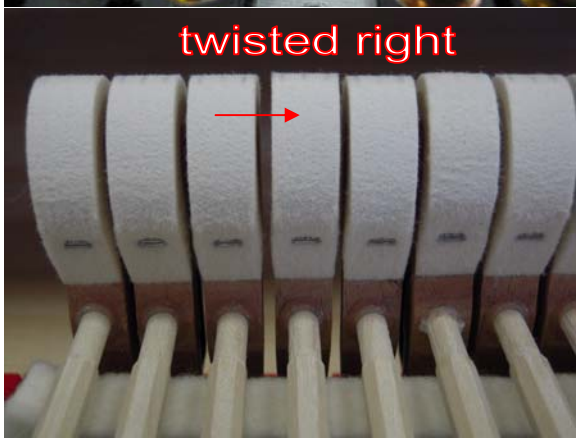


When the hammer was down, the hammer was evenly spaced. When raised, the hammer has moved to the side, indicating that it is not moving straight up.

Place a piece of travel paper between the flange and hammer rail on the same side of the screw as the direction the hammer is traveling. Differences in thickness or length of paper will determine the degree of correction.

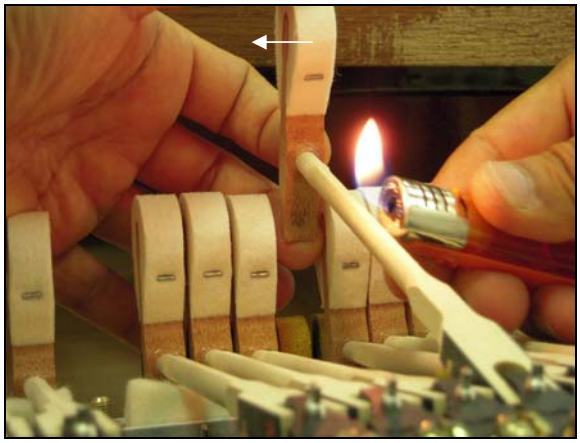
*Note: the travel paper should not be visible once the flange is screwed back into place.

Check the hammer angle at rest position. If the hammer molding space is equal but hammer tip is not equal, the hammer is angled.

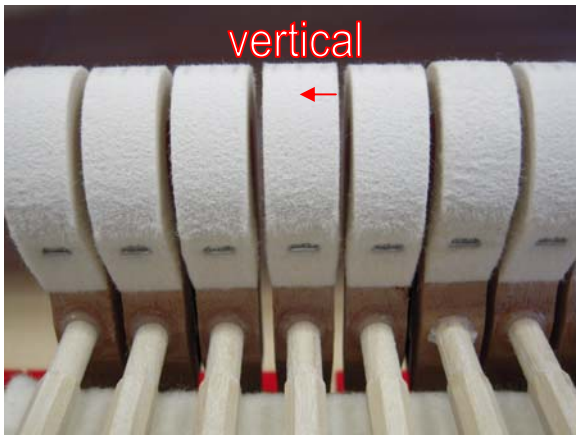


Checking hammer angle – spaces between hammers must be equal and parallel at the "rest" position.
If an error is detected then the shank can be heated up and then carefully and very gently twisted back into the correct alignment position.

*Do not use excessive force as this will stress the flange and possibly damage the bushings.



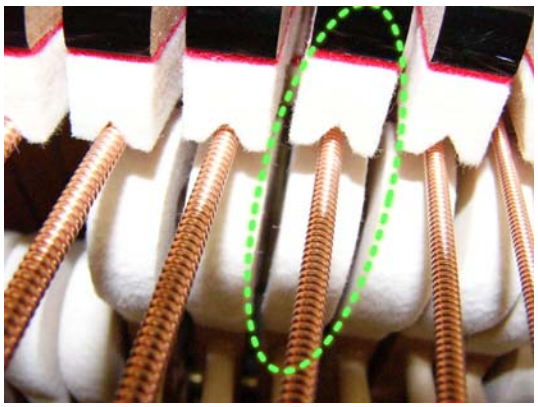
After the hammer angle is corrected.



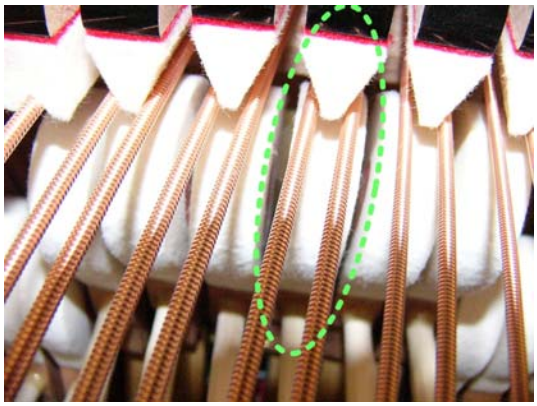
6. Space Hammers to Strings

For single and bi-chord notes, the hammers should be centered under the strings.

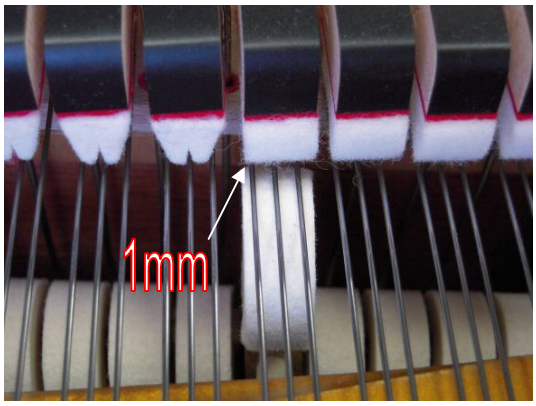
*Note: Double-check that the soft pedal is adjusted to allow the action to return all the way. Press the soft pedal and insert a strip of paper between the keyframe and the action stop block. Release the soft pedal and the keyframe will return and trap the paper strip. The paper should be firmly gripped and cannot be pulled out until released by again pressing the soft pedal.



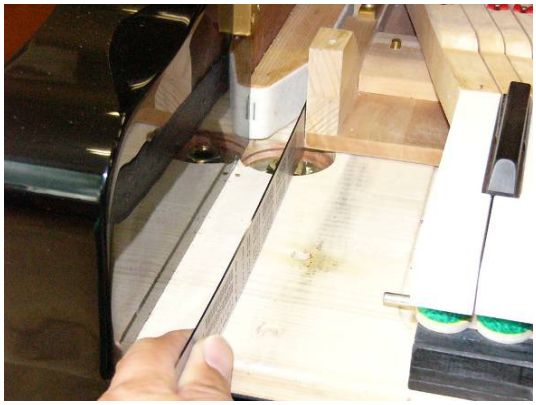
The contact point of the hammer is centered under the bichord strings.



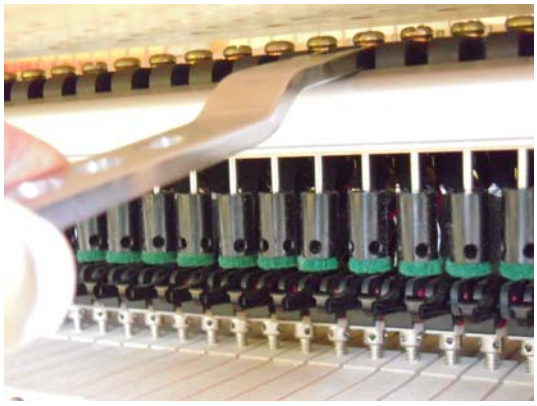
In the trichord note section the bass side of the hammer should overlap the left string 1mm.



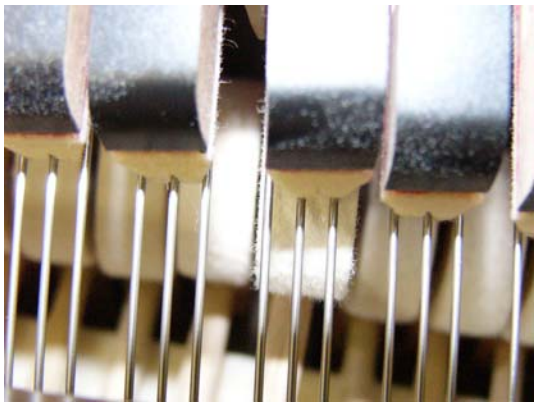
For easy hammer spacing, put 1mm shim (metal ruler) between keyframe and action stop block.



Use the Hammer flange spacer under the pin block while looking down between the strings.

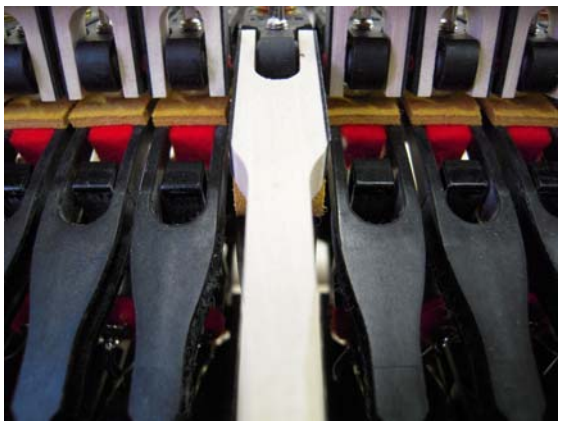


Adjust the left edge of hammer to be even with the left string. After all hammers are spaced even with the strings, remove the metal ruler from the action stop block.

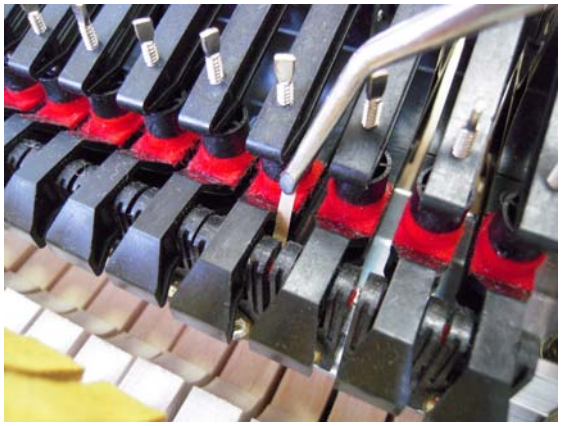


7. Space Wippens to Knuckles, letoff buttons and Capstans

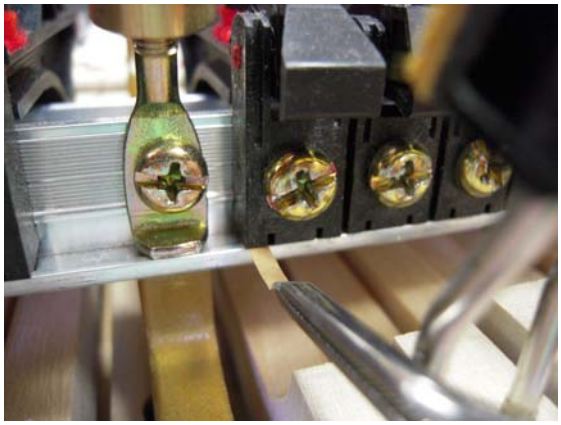
The knuckle should be centered on the repetition lever, the capstan on the repetition cushion and the jack on the regulating button.



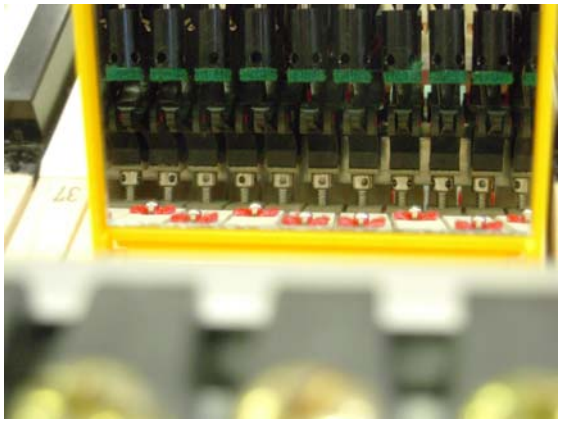
To adjust lateral position of the wippen, loosen the screw and shift the wippen over, or insert a piece of traveling paper behind the wippen flange on the side that you want the wippen to move towards.



To position the jack tender under the let-off button, insert traveling paper underneath the side of the wippen flange that you want the jack to move towards.

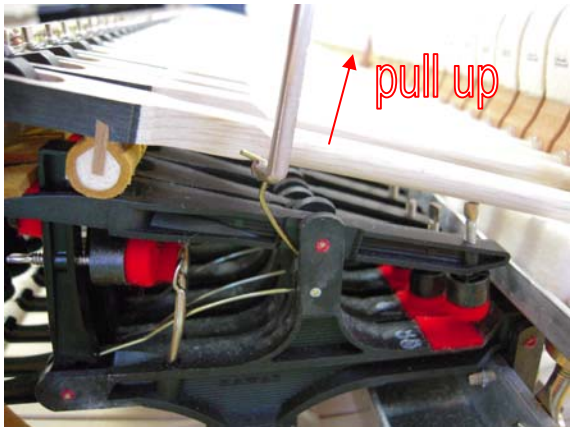


When spacing wippens, use a mirror to watch the jack tenders, and also verify that the wippen heels are centered on the capstans.

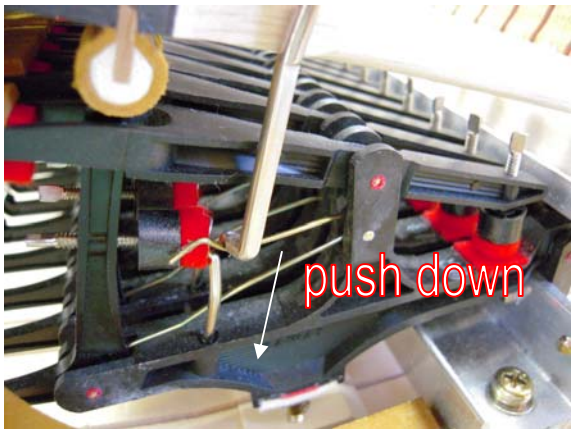


8. Repetition Spring

Strike the key normally and slowly release. The repetition spring should carry the hammer back up in a slow, easy movement without jumping or catching. If the movement is too slow, dislocate the top section of the spring and pull upwards.



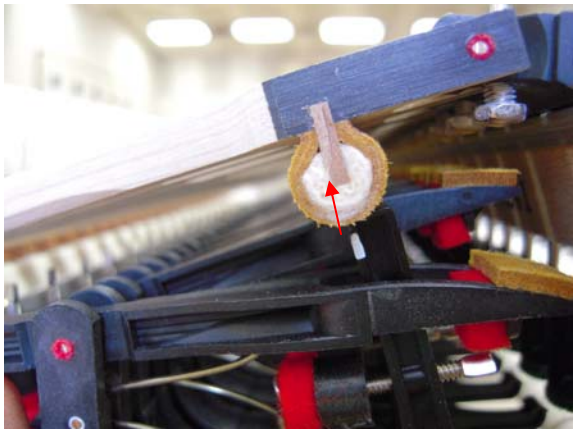
If the movement is too fast, press the spring downwards as shown.



*When pressing or lifting the spring, you need to only change the shape of the coil portion of the spring, not the shape of the curve area.

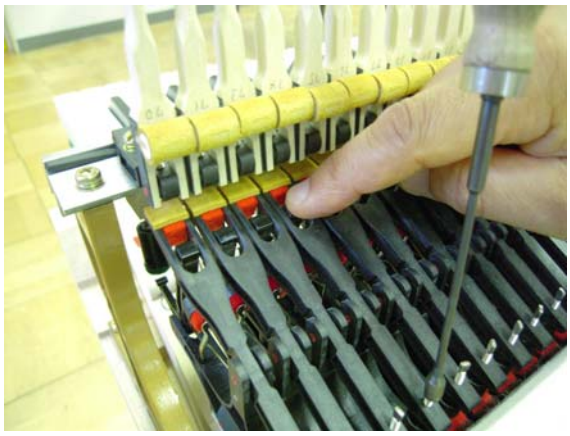
*Always re-check the spring strength with the action in the piano.

9. Jack Alignment, Height



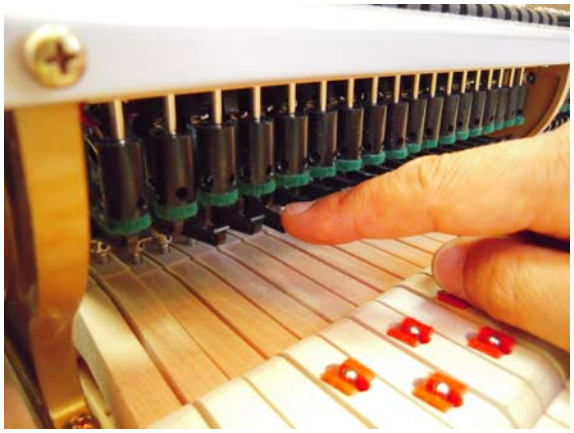
Align jack

Align the back of the jack (nearest the hammers) to the back of the wood core of the knuckle by turning the jack screw in or out. When checking the alignment, be careful of your eye angle to make sure the jacks are aligned correctly.



Repetition Lever height

The top of the jack should be placed slightly lower than the repetition lever (0.1 mm to 0.2mm). When turning the regulating screw, depress the repetition lever to avoid damaging the felt button and pad.



To check repetition lever setting:

To check the repetition lever height, with the hammer in the "rest" position gently and slowly press down the jack heel. The hammer should barely move. If it drops but doesn't return when the jack is released, then the repetition lever is too low. If the hammer does not move when the jack heel is pressed, then the repetition lever is too high.

10. Square and level Keys

Should be 66mm to 68mm from Keybed to the top surface of the white key, depending on the model.

Set sample keys at each end, then level all keys with a straightedge.

MODELS	NEOTEX
SKEX EX GS100	68.0mm
SK-7 RX-7	68.0mm
SK-6 RX-6 RX-A RX-B	66.0mm
SK-2.3.5 RX-2.3.5.	66.0mm

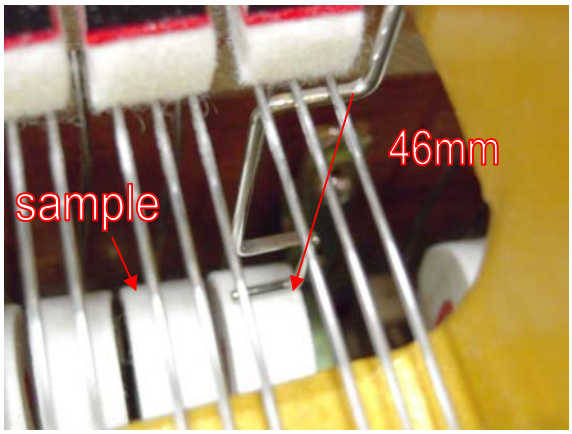
Place thicker punchings lower on the pin, and thinner punching paper above, just under the felt punching.

Square the keys so that the top surfaces are horizontal, by tapping the balance pin side to side.

Adjust Black Key Height 12.5mm from White key top.

11. Hammer Blow Distance

Set sample hammers to the correct blow distance at both ends of each section. Hold the blow distance gauge between one hammer and the string, then adjust the capstan on the next hammer so that it matches the sample. The blow distance should be 46mm.



Once sample hammers are set, slide action out and regulate the capstan screws in the remaining hammers to form a straight line.

Level Hammers in each section using the capstan screws.

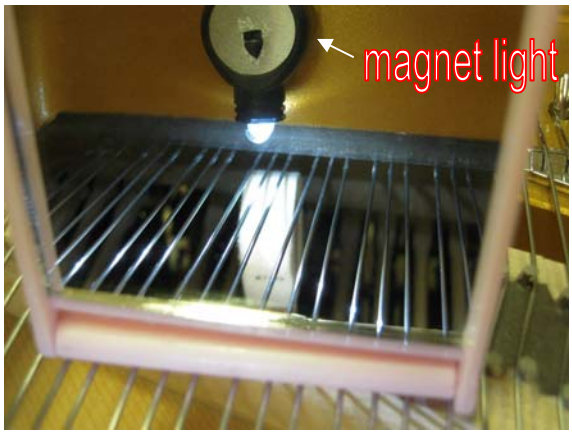
12. Hammer Rest Rail

Set the hammer rest rail 5mm below the hammer shanks in the rest position.

13. Letoff

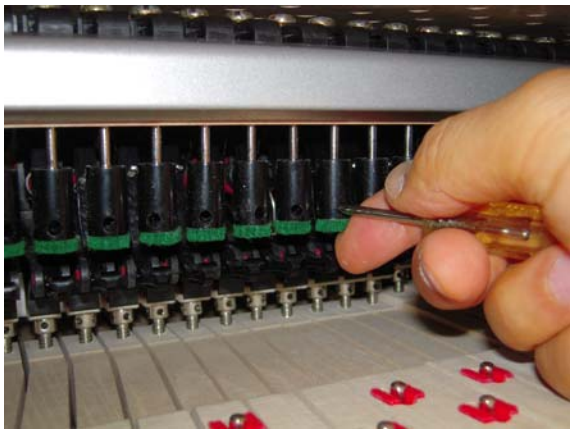
Adjust hammer letoff Distance.

To improve accuracy, place a light directly above the string and watch the string's shadow on the hammer felt.



Press each key down slowly with one hand while adjusting the letoff dowel with the other hand to set the letoff distance.

In the bass section letoff should be 2.0mm - 2.5m, middle and treble 1.0mm - 1.5mm.



14. Hammer Drop

Regulate each hammer so the drop screw touches the top of repetition lever at the same time the jack should touch the regulating button. The initial fall distance of the hammer will be the same as the letoff.

*Make sure to re-check this with the action in position in the piano itself.

15. Key Dip

15.1 White Key Dip

Using a dip block, 10.1mm, depress each key and compare with height of the neighboring key. Add or subtract punchings until desired dip is achieved. Put paper punchings under cloth.

*Make certain that the same pressure is used throughout the key board. Move back and forth to re-check your finger pressure as you regulate.

Another way to double check for evenness is to push down 3 keys with 3 fingers using same pressure and compare the Dip.

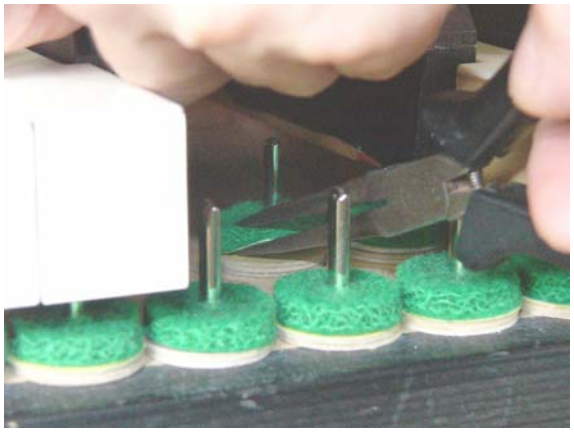
*Thicker paper lower, thinner paper upper.
Maximum of 4 of any one size.

15.2 Black Key Dip

Set the black key dip by comparing the feel of the aftertouch in the white keys with that of the neighboring black keys. Remove or place punchings underneath until the aftertouch feel is the same. Put paper punchings under cloth.

*When checking aftertouch, the dampers should be lifted up with pedal

Thicker card and paper should be lowest on the pin, thinner paper upper. There should be no more than 4 of any one thickness paper.



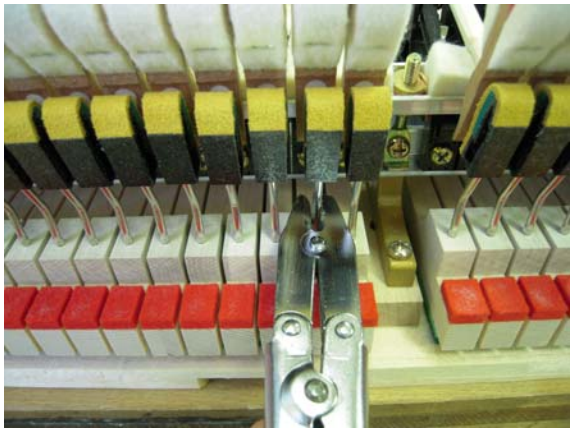
Black keys should be about 2mm higher than white keys, when black keys pushed down to bottom.

16. Back Checks

Correct backcheck angle.

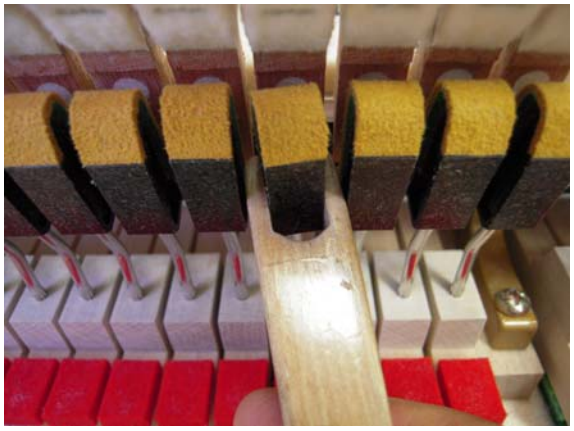
If setting the backchecks to the correct specification (15mm from string) results in the hammer tail dragging on the backcheck during fortissimo playing, then the backcheck angle is too steep.

When key is played and the hammer is in check, tap the hammer down into the backcheck. If the hammer can be pushed down all the way, then the backcheck angle is too vertical.



Alignment

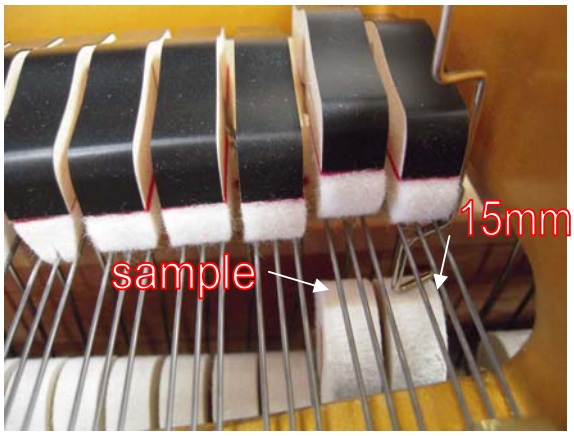
Using bending pliers, space the back checks so they are even and square to the hammer tails. The back check wire must be bent twice, once at the bottom and the opposite way at the top.



The backchecks must be uniformly spaced and their back surfaces parallel to the hammer line

17. Backchecks

The hammer top should be an average distance of 15mm from the strings with the key is played and the hammer is in check. Set the outer key of each section then align the other keys.



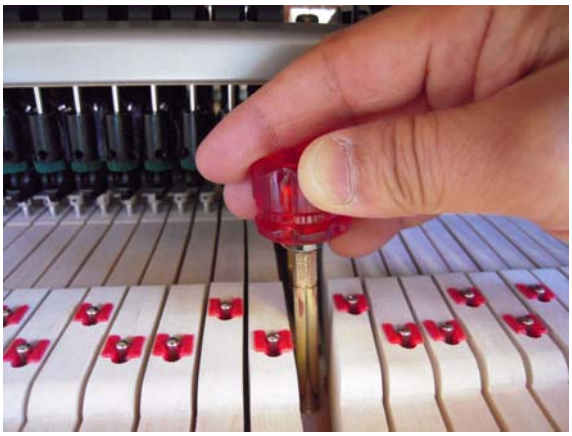
Check to see that the hammer tails do not drag on the back check by moving the key with one hand and pushing down on the hammer with the other. If the tail drags, adjust the angle of the back check again.

18. Repetition Spring (recheck)

Re-check the repetition spring regulation after setting the backchecks.

19. Balance Rail Studs

When regulated correctly, the balance rail studs (glide bolts) should just touch the keybed, but not lift the balance rail. Knock on the tops of the keys while turning the screw, lowering the studs just far enough to stop the knocking noise.
Then lift up on the hammer rail with one hand while knocking on the tops of the keys with the other hand. Check for even pressure for each of the studs.
For left side stud, push Una Corda Pedal slightly to check.



Start by setting the stud at the tenor break (just above the bass section), then set the bass end and recheck the tenor break stud again. Then move towards the treble (right) side, re-checking the previous stud each time.

Then re-check them again with the damper pedal pressed down.

Finally, adjust the 1 or 2 hidden studs underneath using pliers or 12mm wrench.

A long straightedge can be used to set the hidden balance rail studs.

Finally recheck all the studs using the knock test from above.

20. Damper

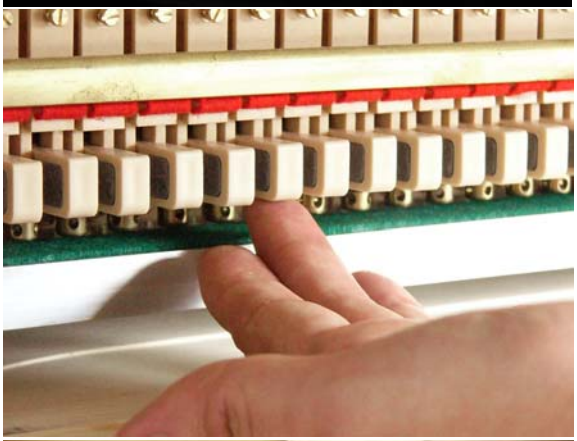
Alignment

Adjust the dampers so they are seated squarely on strings.

Make sure the dampers travel straight by bending the damper wire twice.

Keep the damper wire and damper head parallel.

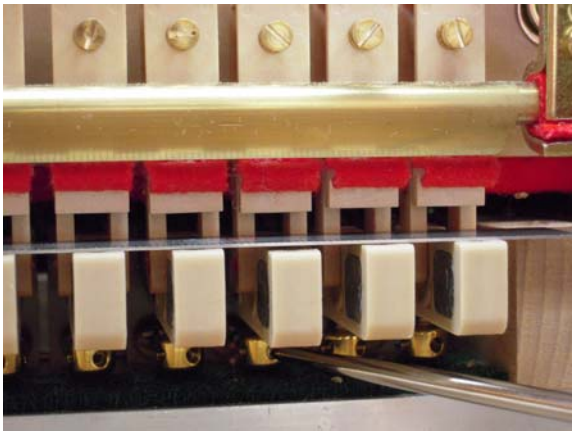
When you push up damper lever slowly the backside of damper should lift up very slightly earlier than front side.



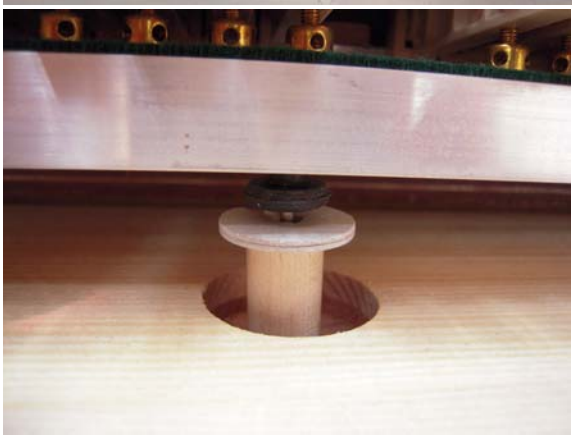
The damper wire should be at right angles to the bottom surface of the damper head, but the damper head should still lift slightly from back first.

Level Damper Levers

Loosen all damper block screws, and adjust damper lever capstan to make the damper levers same height. Place a ruler on top of the damper levers as shown to assist in adjusting the capstans.



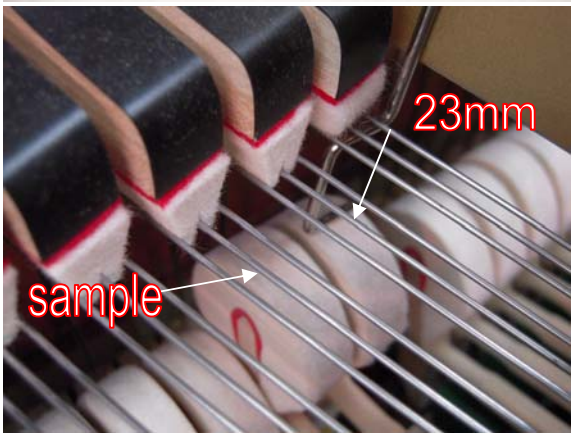
Place a 2mm thickness paper punching between the pitman and the damper lift rail.



Initial Damper lift

Adjust pedal rod head to set the sample damper levers so that they start moving when the hammer is 23mm (1/2 blow distance) from string.
Tighten damper wire screws for sample damper levers in each section.

Reinstall the action and check the damper lift.



Once the samples are set, tighten all damper wire screws, then remove paper punching and correct the damper head alignment.

Damper lift with Pedal

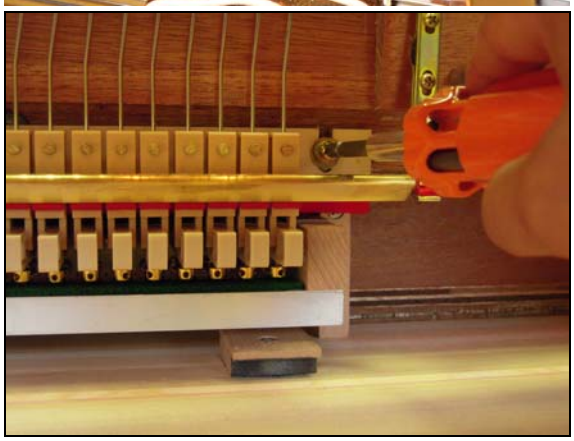
Once dampers are tightened and aligned, recheck the dampers for even lift with the damper pedal. To adjust, loosen the screw in the damper top flange and move the lever up or down.

*Do not use the capstan screws for this adjustment

21. Damper Stop Rail

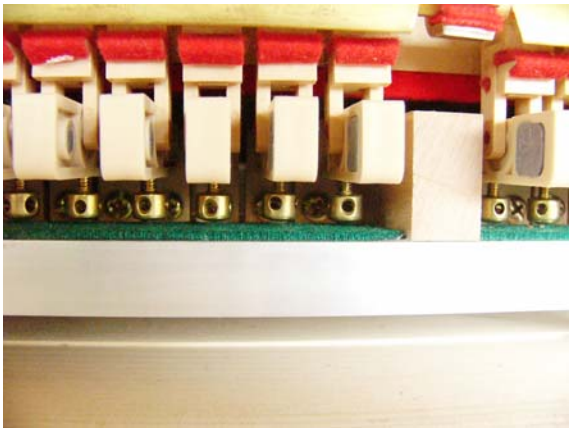
Press a black key and lift the damper head to see how much movement is remaining. (1 to 2 mm is permissible)

Make certain that the damper levers will not touch the sostenuto rod even if the lever is lifted up strongly.

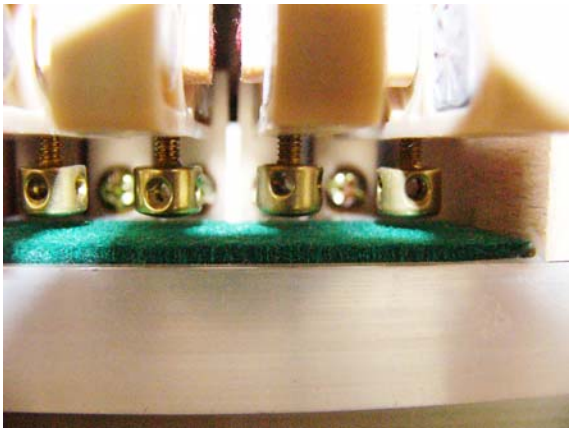


22. Damper Pedal

Adjust the damper tray height.

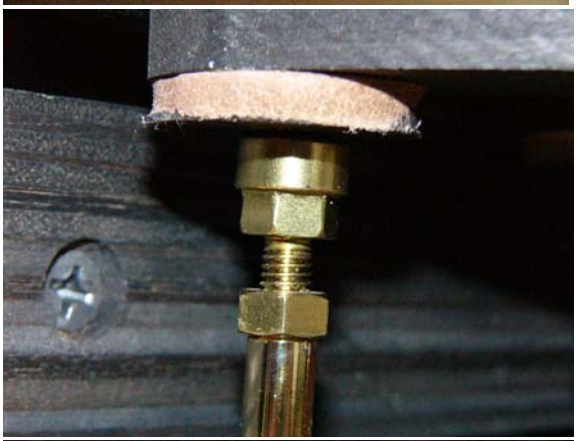


There must be slight lost motion in the damper pedal (approx. 1 to 2 mm), which is adjusted using the head of the pedal rod.



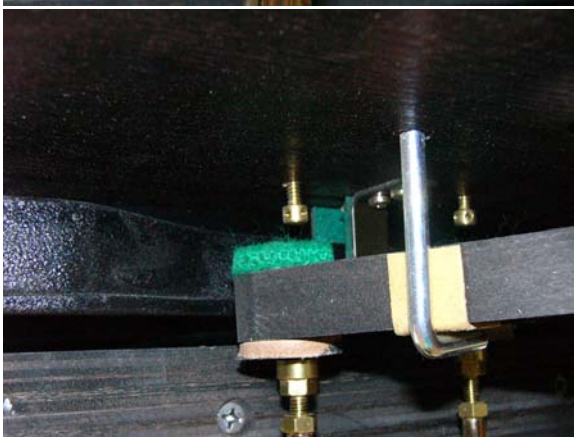
The head and pedal lever should be adjusted to create lost motion at the damper lever.

Tighten the bottom lock nut with 10mm wrench while holding the pedal rod with the other hand.

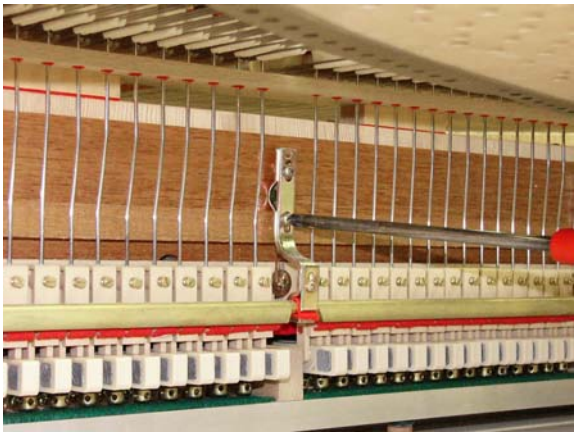


Pedal Stop Capstan

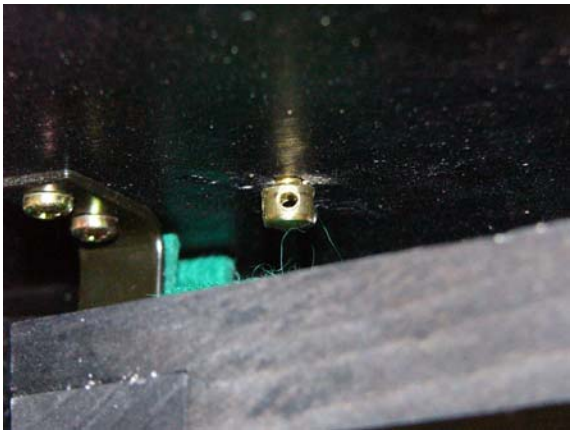
The dampers should be lifted to the same height with the pedal as they are with the black keys. Adjust the pedal stop capstan so that the pedal lift matches the black key lift.



23. Sostenuto



Set the height of the sostenuto rod to be slightly higher than the tabs on the damper levers.
Then adjust the sostenuto bracket screws so that the rod does not cover the tabs when viewed from above. Tightening the bottom screw will bring the rod closer to the tabs. Tightening top screw will bring rod away from the tabs.
*Adjustment should be uniform across the rod from bass to treble.
*When one screw is tightened, the other should be backed off by the same amount to avoid unnecessary tension.



Adjust the lift height (sostenuto rod angle) with the capstan under the keybed. The sostenuto pedal should hold the dampers at the same height as the key.

*Test by pressing the pedal and striking non-sustained keys with forte blows to make sure they will not catch.

*Check that sostenuto function works for all dampers.

24. Una Corda

When the una corda pedal is pressed all the way down, the hammer should strike only 2 strings in all 3-string notes (tenor and treble sections).

The left string should not be struck.

Shift pedal

Adjust with the nut at the top of the pedal rod so there is no lost motion in the pedal. Adjust the screw in the right cheek block so the action will shift, allowing the trichord hammers to clear the left string, and all hammers should strike the strings halfway between string marks.

KAWAI GRAND PIANO SPECIFICATIONS

Model	Key Height	Key Dip	Blow Distance	Let Off Bas. Mid. Tre	Drop Bas. Mid. Tre	Back Check
KG2C-5C	67	10.5	46	3.0 2.5 2.0	3.0 2.5 2.0	17
KG8C	67	10.5	46	2.5 1.5 1.5	2.5 1.5 1.5	B16 MT14
KG1D-5D	65	10.5	46	2.5 2.0 1.5	2.5 2.0 1.5	B17 MT15
KG7D	65	10.5	46	2.0 1.5 1.0	2.0 1.5 1.0	B16 MT14
GS30	65	10.5	46	2.0 1.5 1.0	2.0 1.5 1.0	B16 MT14
GS50	65	10.5	46	2.0 1.5 1.0	2.0 1.5 1.0	B16 MT14
GS70,80	67	10.3	47	2.0 1.5 1.0	2.0 1.5 1.0	15
GS100	68	10.3	47	2.0 1.5 1.0	2.0 1.5 1.0	15
GS40,60	65	10.3	47	2.0 1.5 1.0	2.0 1.5 1.0	15
RXA,R1	65	10.3	46	2.0 1.5 1.0	2.0 1.5 1.0	15
GE1,GE2	65	10.3	46	2.0 1.5 1.0	2.0 1.5 1.0	15
KG1E-6E	65	10.3	46	2.0 1.5 1.0	2.0 1.5 1.0	15
KG1A-6A	65	10.3	46	2.0 1.5 1.0	2.0 1.5 1.0	15
R0,R1,R2	65	10.3	46	2.0 1.5 1.0	2.0 1.5 1.0	15
GM2,GM10	65	10.3	46	2.0 1.5 1.0	2.0 1.5 1.0	15
GE20,30	66	10.3	46	2.0 1.5 1.0	2.0 1.5 1.0	15
RX1-6	66	10.3	46	2.0 1.5 1.0	2.0 1.5 1.0	15
RX7	68	10.3	46	2.0 1.5 1.0	2.0 1.5 1.0	15
SK2-6/GX1-6	66	10.1	46	2.0 1.5 1.0	2.0 1.5 1.0	15
SK7/GX-7	68	10.1	46	2.0 1.5 1.0	2.0 1.5 1.0	15
EX	68	10.1	46	2.0 1.5 1.0	2.0 1.5 1.0	15
SKEX	68	10.1	46	2.0 1.5 1.0	2.0 1.5 1.0	15