INSTALLATION MANUAL

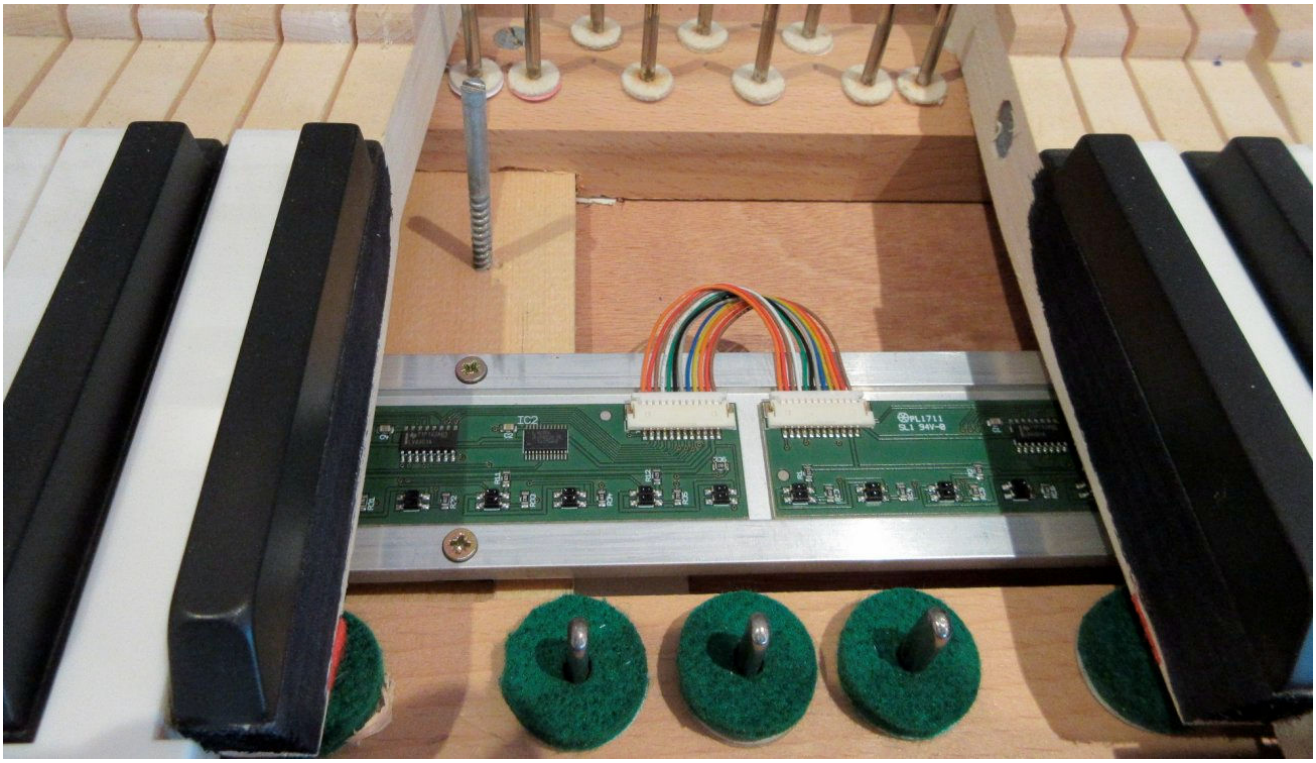
Silent retrofit system MOTUS 5

(Version 17/07/2023)

-Upright piano-

-Keyboard sensors installation.

Remove all keys. The edge of the sensor rail should be approximately 5mm from the sharps board, photo below. Cables to the rear. Use the sharps near the ends of each sensor circuit to ensure the best lateral centering, place yourself vertically on the keyboard and visually center the circuits to have the most equal distance possible between the key and the 2 neighboring sensors located on the side and other. Use 5 fixing points at approximately equal distances (the unused holes are provided for grand pianos). Point and drill through the 10 rail mounting holes, 2.5mm diameter drill bit. Fix the 10 height adjustment springs on the rear side of the rail. The insertion is done easily by a counterclockwise rotation. The rail is fixed to the tray with wooden screws between 3x20 and 3x40 depending on the chassis heights, only the 3x40 are supplied, these screws passing through the springs in order to adjust the height. For chassis with very little height under keyboard, Kawai or Schimmel type, it will be necessary to cut and protrude the springs by about 5mm, it is also possible to put the rail directly without spring, the height then adjusting with paper wedges. Use the circuit fasteners with ovalized holes on the rail to make a precise lateral adjustment if necessary.

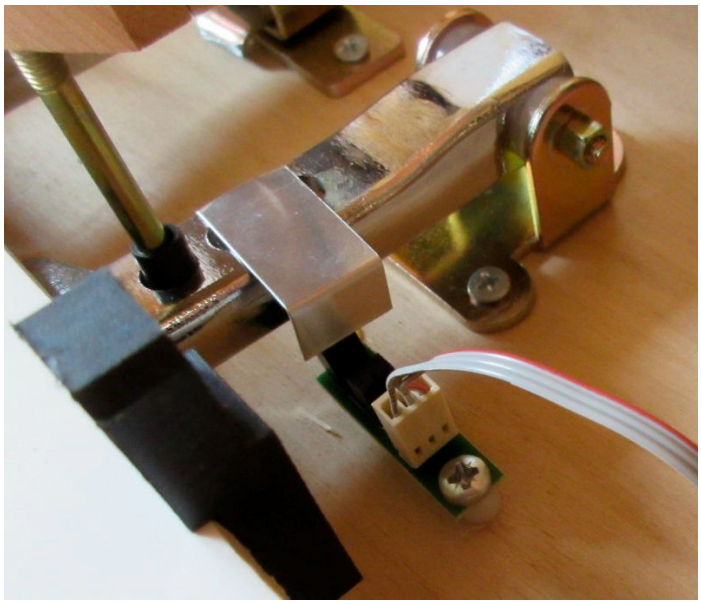


Positioning sensors

Temporarily adjust the height so that the top of the sensors is approximately 3mm below the black keys in the depressed position without compression of the front rail punching. This corresponds to a distance of

approximately 7mm from the printed circuit. Leave only the sharps on the keyboard closest to the rail height adjustment screws, the white ones will be reassembled later.
Place the control unit under the keyboard on the right, connect the multicolored 7-line cable to the circuit of 16 acute P4 sensors, metal pads upwards opposite the printed circuit.
Do not pull on the cables to disconnect, pass the nails over the lateral recesses provided for this purpose.

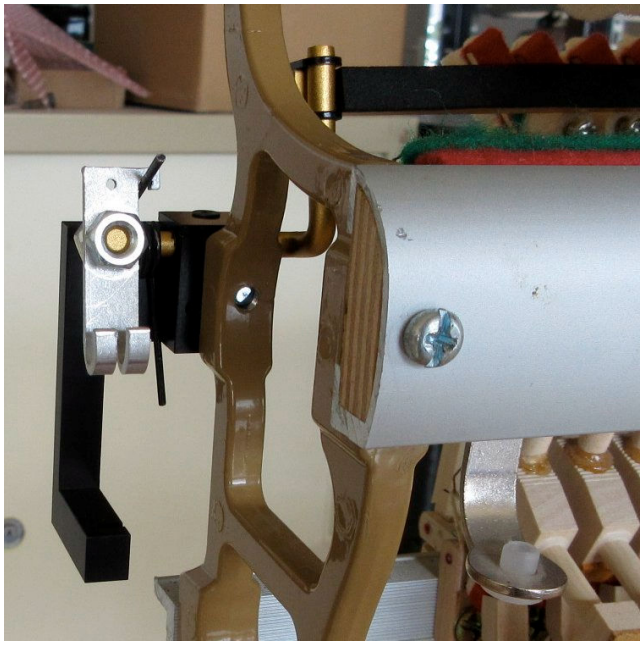
-Pedales sensors.



Screw the sensor with his white washer as shown on photo, use the aluminum part provided, cut and ply, glue with neoprene glue on top of the pedal, the vertical part has to go exactly in the center of optical fork. In the up position the sensor must be free opened. Connect the cable 1x6 table for two pedals, the pink wire indicating the left soft pedal. The two slides on connector must be toward the optical fork sensor, if the connection is inverted, the pedal does not function.

-Hammers stopper.

A system with an 8mm x 8mm aluminum square was adopted rather than an aluminum profile, the drawback of the profile being to restrict the stroke of the bass dampers on certain pianos, moreover, this solid aluminum square is less noisy than a profile and the cutting work on the way is eliminated.
Remove the choke bar. Clip the 3 hinges on the 3 brackets. Screw the assembly on the 4 fasteners of the damper bar respecting the direction of fastening according to photos 6 to 9. Adjust the first bracket laterally so that the central axis of the hook is in line with the cable outlet sheath (photo 6). Adjust laterally the caliper of the low-midrange passage so that its base does not touch the handle of the hammer in its course, if the passage is very narrow you can tighten the base of the caliper with a vice to reduce the center distance of the 2 vertical arms. The caliper of the medium high passage photo 8 is fixed on the square already in place or the supplied square if absent, rectify it laterally with the vice if the handle of the neighboring hammer touches the base of the caliper. Cut the aluminum square to the length of each section by marking the outer edges of the arms of the stirrups with felt. Pay attention to the direction of installation according to photo 7, the recessed part on the side of the dampers at the level of the low-medium passage to leave the maximum clearance space, the cut to length being made at the other ends of the 2 aluminum squares. Cut and glue the rubber band with neoprene glue on the 2 aluminum squares, leaving a space of about 6mm at each end in place of the caliper. Place them by slightly tightening the rings temporarily, screws on the damper side, according to the photos below.



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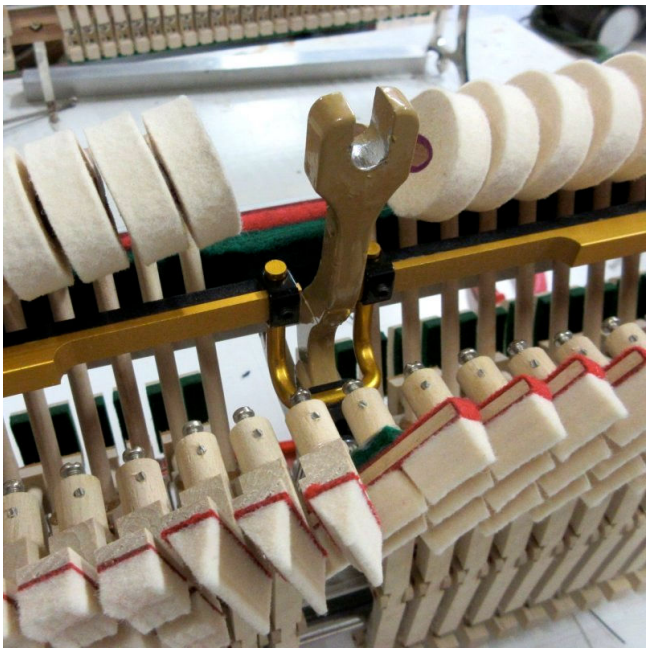

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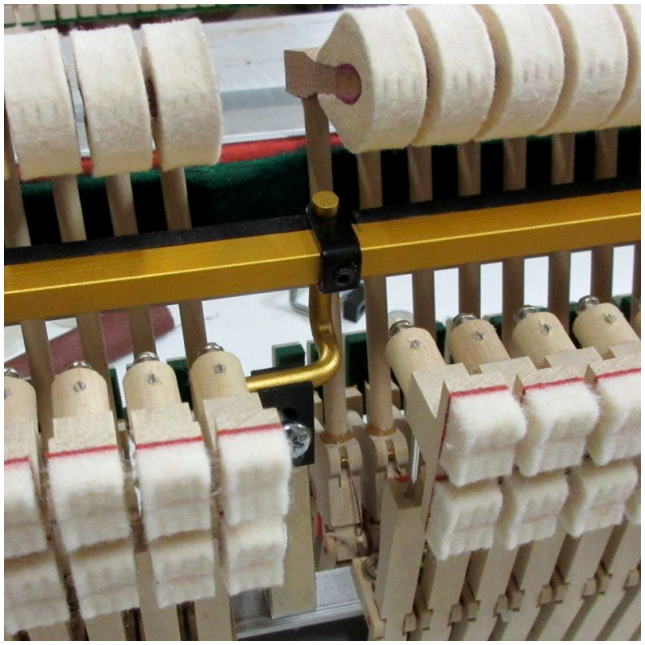

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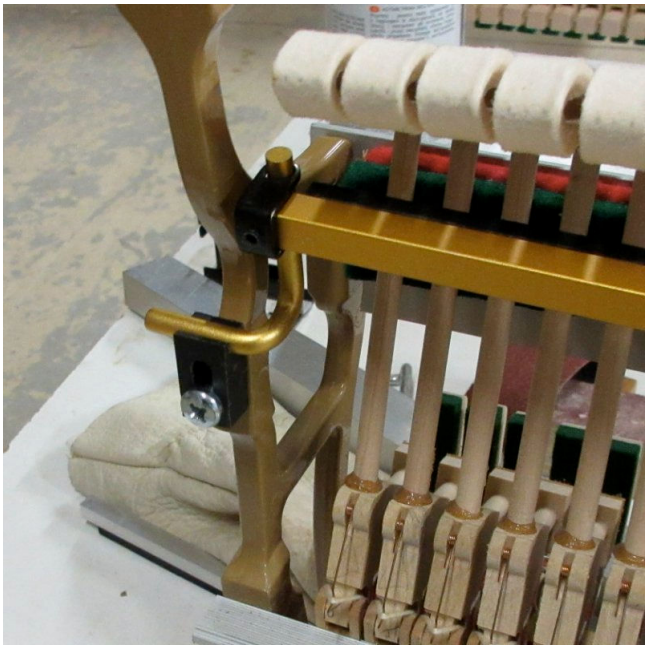

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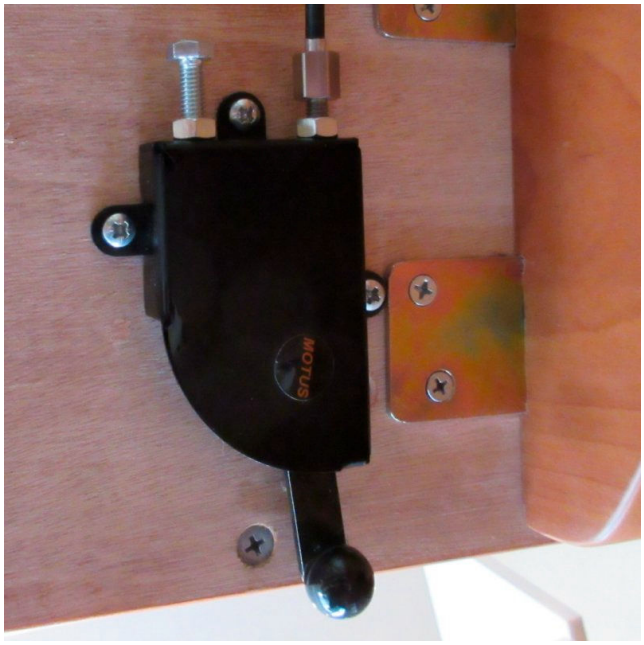
Thanks to the ovalized holes of the hinges, find the best compromise to adjust the height of the blocker, if necessary you can also adjust the height with the clamping rings of the aluminum square, but it is preferable to keep the maximum distance between the aluminum square and the axis of rotation. The ideal is to be as high as possible for a better capacity of blocking the hammer in "strong" while leaving enough room for the passage of the corner of tuning in the high medium. Tighten the rings and the hinges definitively, the first hinge receiving the steel spring support must be tightened very firmly to avoid any movement due to the traction of the blocker control.
Place the mechanism in the piano, manually use the arm of the control bracket to bring the locking point of the hammers to 5 mm from the strings, check that this distance is constant throughout the register, if this is not the case , place the setting flies open under the hinges to better equalize the locking point.



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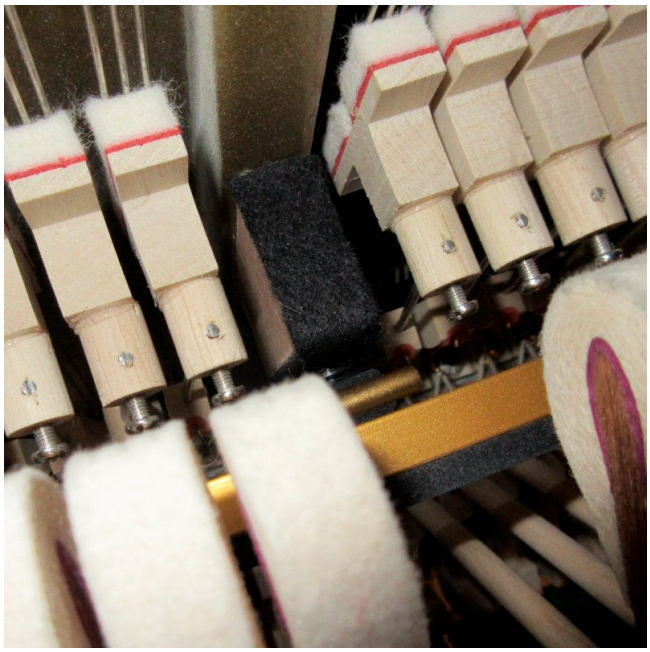

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Engage the return spring (photo 6). Tighten the hook nut firmly with a pipe wrench.
Fix the control lever under the plate on the left as shown in photo 10, put the lever in the ON position by bringing it to the stop on the left, insert the sheath into its receptacle at the level of the mechanism and into the adjuster located the back of the lever housing. Make a first rough adjustment of the locking point at 5mm from the ropes by adjusting the cable clamp in the groove of the hook, tighten firmly in the correct position. The fine adjustment is then done with the adjuster on the housing.
Deactivate the ascender, lever on the right, to switch back to acoustic mode, use the stopper screw on the box to adjust the OFF position of the ascender, bring the first midrange hammer to the strings, in this position, the rubber of the ascender must be 1 mm from the hammer handle in order to leave as much space as possible for the clearance of the dampers from the passage.

On some pianos, the first midrange damper can come up against the blocker, in this case, remove the damper button fixing screw, coat the rod with neoprene glue and replace the damper on the string, mechanism in place in the piano. If this is not enough, saw off the end of the button to get proper clearance.

It is advisable to introduce the bevelled wooden block provided between the hinge of the high midrange passage and the upright of the frame as shown in photo 11, this increases the overall rigidity of the ascender and makes it possible to stop the hammers as close as possible to the strings for adjustment exhaust closer, the repetition is also improved, the return of the hammer being faster with a more rigid ascender. Introduce it in its location until contact with the hinge screw, mark and shorten to approximately 5 cm in length, cover the edge with a strip of black felt and glue the frame side with the mechanical neoprene glue in place by coming contact with the hinge screw. (Photo11)

Switch to silent mode, then adjust the exhaust by checking that the exhaust goes smoothly on the blocker without cracking. For proper operation of the silencer in rapid repetition, it is necessary to reduce the thong play to a minimum, the exhaust stick must be almost in contact with the hammer nose with a play of approximately 0.2mm, otherwise it will slip. sticking on the nose can occur in rapid repetition and sound an unexpected "Loud" note. Likewise, the adjustment of the catches must be as close as possible to the ropes, ie 10mm.

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-Installation of the Bluetooth application.

Go to the Google Play Store for the Android version or the Apple store for Ios with the keywords MOTUS BLE to install the application. Activate global location on your phone, deactivate Bluetooth and reactivate it. Launch the application. When you turn off the box, you must also completely close the smartphone application (and not simply minimize it), and relaunch it to power up the box again in order to initialize Bluetooth detection...

-Installation of the case.

The box is fixed under the plate on the right, drill at 3mm and fix with the 4x16 screws. Leave a recess of about 5mm from the front of the plate. The 7-line cable from the keyboard sensors connects to the metal pads at the top opposite the sound card.

For the mini box option, the main box is placed inside the piano on the right side as far forward as possible to allow the passage of a DIN5 MIDI connector, USB at the top. Disconnect the cable from the ON/OFF connector of the main box and instead connect the ON/OFF cable of the mini box, pass it through the rear opening of the box above the keyboard input to leave the Bluetooth antenna free. Connect the headphone and USB sockets. On a grand piano, the case is usually attached to the left of the right leg.

-Fixing the standard version control box unit.

The box is fixed under the tray on the right, drill at 3mm and fix with 4x16 screws. Leave a gap of about 1 cm from the front of the tray. The 7-line cable of the keyboard sensors connects metal pellets upward to the opposite of the sound card.

- Step 1: Setting of the sensors height.

Glue the white reflector centered above the sensor. Leave only the black keys near the adjustment screws, put the mechanics in place to keep the keys in the high position. Switch to parameter display mode, for this, press the M key (Menu) then the + key until "SENSOR HEIGHT" validate by pressing again M. Play a key close to the height adjustment screws, the screen below below appears.

The system detects and displays a pressed key parameters, N is the note number, R is the reflection level of the optical sensor hundredth of Volt, P is the position (the origin is not the rest position but is situated above), FC is the end of stroke that will be stored in a subsequent step, and finally H is the distance between the underside of the key and the top of the sensor, in tenth of mm. Hold the sharp key near the down position adjusting screw medium pressure, adjust the height for H = 20 is 2 mm distance is the distance required for the sharps. If the sensors are too close or below 13 or 1.3 mm XX sign appears. White will automatically be a little higher, on the order of 30 is 3 mm, it will depend on the type of keyboard. The height adjustment screws will not have exactly the adjustment value of 2 mm, this is due to the irregularity of the keyboard and does not matter in the final operation. Insofar as this is done disassembled keyboard, too much ambient light as a sunny room or direct radiation from a projector can inadvertently trigger the sensors, it will not reflect a flicker of the screen, this step should be carried out in a medium light. Also, do not replace keys while the screen displays the settings for the sensors interpret new keys placed as played and the display is unstable.

Once the heights have been adjusted, turn off the system before reassembling the keys.

Step 2: Memorization of the dynamics and ends of stroke.

Reassemble all the keys gluing the white reflector centered above the sensor, as well as the mechanics to be in normal conditions of use. Deactivate the hammer blocker, the next setting being in acoustic mode. Switch to initialization mode, to do this, press the M key (Menu) then the + key until "INITIALIZATION" confirm by pressing M. At this stage "S1: 50 S2: 80" is displayed on the screen, S1 is the first speed sensing threshold of the key, it is set by default to 50% of the stroke, in other words, it is in this case halfway that the speed measurement begins, consequently , it will also be the reset point where the key can replay, and it is also the Note Off point where the note played stops. S2 is the 2nd capture threshold which stops the timer for measuring the time elapsed between the 2 thresholds S1 and S2 and therefore makes it possible to calculate the speed of the key and consequently its audio intensity. The default setting of S1 at 50% and S2 at 80% of the stroke is a good compromise, but you can modify it in order to best adapt the keyboard's responsiveness to the pianist's wishes. You use the + and - keys to vary S1, press M to adjust S2, and again M to return to S1. It is advisable to keep 30% of difference between the 2 thresholds, the fact of putting the thresholds higher as for example S1: 30 and S2: 60 will be more comfortable for the beginners, because the note plays in S2 higher in the race, this authorizing a less good articulation in the game, a good pianist will prefer the thresholds S1: 50 and S2: 80 because the rearming is lower and allows very tight trills.

Once the thresholds are adjusted, you must now play pianissimo slowly with one finger all the notes chromatically. This step makes it possible to memorize the end-of-travel position of each note "Fc", without compressing the sinker fly, as well as its dynamic coefficient "Co". When the key is returned, the saved parameters are displayed, screen below.

Once the operation is complete, press STOP to reset.

Step 3: Individual adjustment .

Press the "Menu" followed by the "+" key until you see "REGLAGES" on screen, confirm again by pressing "Menu," "Clavier ..." should appear. Playing a key, the following screen appears. 74 V: 34 M: 42^^: 30 F: 190

N is the number of the note played, V is the speed of depression of the key, M is the Midi sound level audible to the headphones, calculated by the software according to the speed V, I% is the setting of the individual volume of the note for reducing or increasing the value of M at equal driving speed. G% adjusts the overall dynamic range of the entire keyboard.

The individual setting compensates for any irregularities. Perform a slow chromatic scale "Mezzo forte", if a note seems stronger or weaker, stop on it, its number is displayed, use the keys + or - (automatic scrolling)

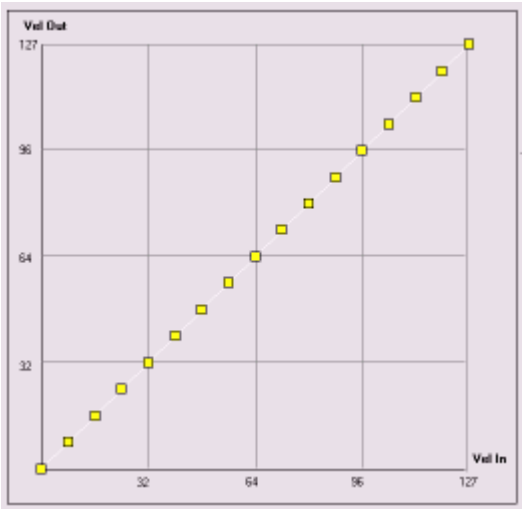
to change the volume. Press the Menu key to switch to the G setting with the + and - keys, a new press returns to the I setting. The G coefficient is the same for all notes, when you play "Strong" the value of M must not saturate with 127, but must be around 110 or so.
This tuning mode is intended to play one note at a time, or arpeggios to facilitate equalization, playing chords or even playing too fast can result in unexpected "loud" notes, do not play faster only one note per half second, and only one at a time. Press "STOP" to exit the settings mode.

Touch adjustment.

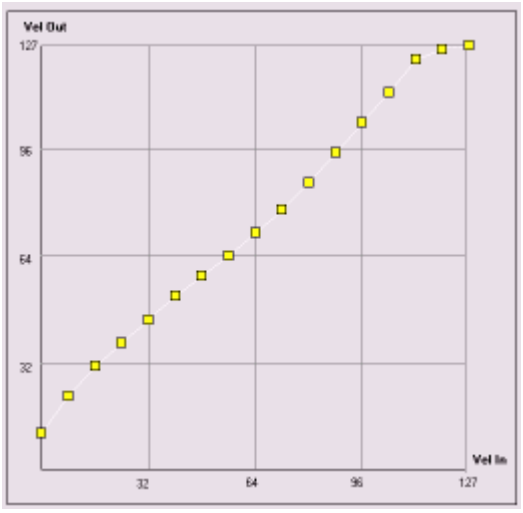
Press the "Menu" button followed by the "+" button until "CURVE" is displayed, confirm by pressing "Menu" again. By default the dynamic slope coefficient is set to 0, this may be suitable for a very flexible keyboard, for a firmer keyboard, it is possible to define 4 dynamic curves from 0 to 3 using the "+" keys and "-". Having a higher value reduces the dynamic range of the Pianissimo to the Forte, and the volume is increased in Mezzo, playing the piano by varying the value and validate the most realistic touch by pressing "Menu" . The individual adjustment made in step 3 must always be done with the default curve equal to 0 in order to have a maximum range of variation and a better accuracy in the equalization.

COURBE 1

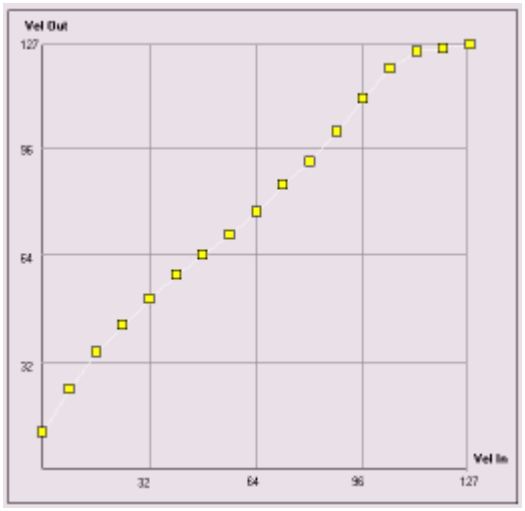
Explanation of the 4 curves.



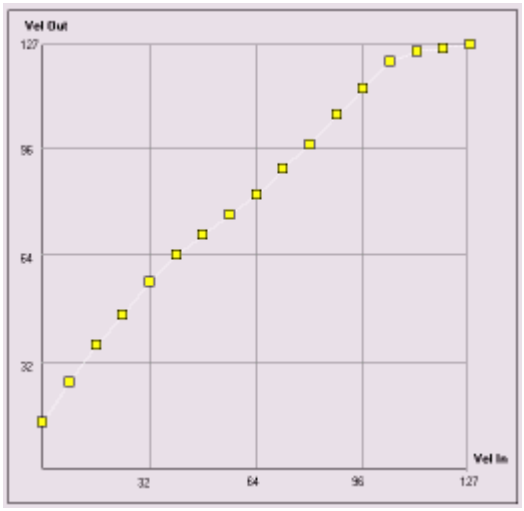
COURBE 0



COURBE 1



COURBE 2



COURBE 3

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Customization of the display at startup.

If you wish, you can display your company name at system startup for 1 second instead of the standard "MOTUS 3 Initialize" display.

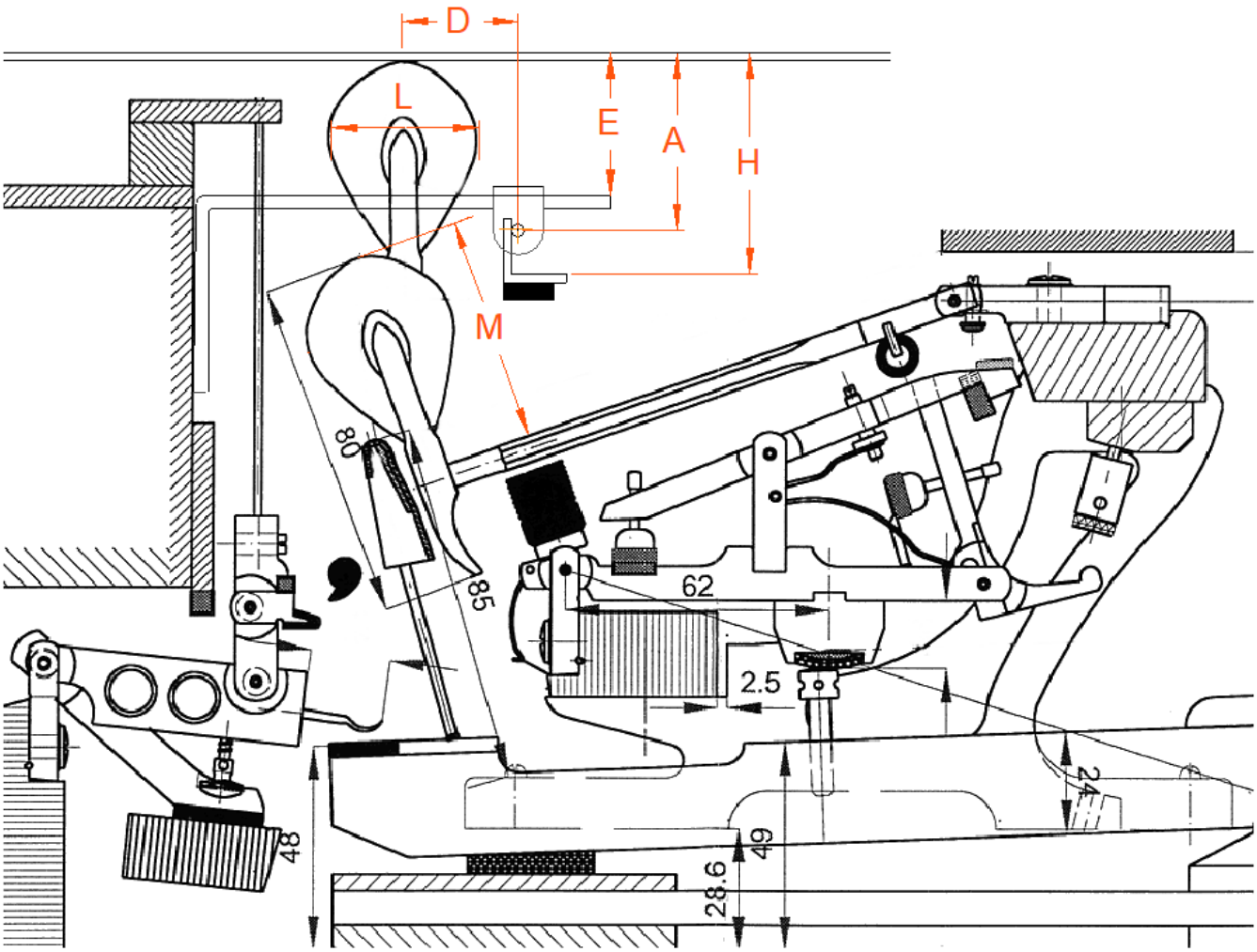
- Your 1st line -
- Your 2nd line -

You will find the information for this operation on www.motus-silencer.com/maj.htm

-Grand piano-

-Fixing the hammers stopper.

The diagram below shows the measurements for the placement of the brackets. The angle bracket here in the locking position pivots 90 ° forward to release the hammers.



Begin by measuring the value M, distance from the top of the neck to the top of the hammers, make this measurement on the first and last hammer of the bass, as well as on the first hammer of the midrange, then the first hammer of the passage mediums, high mediums , and finally the last hammer No. 88. Note these values M1, M2, M3 and M4.

Calculate and record then the 4 values of H ie H1, H2, H3 and H4 with the following formula in mm:

H = M + b + d - 6

Or "b" is the locking distance of the hammers from the underside of the rope, usually 4mm
and "d" the diameter of the rope concerned. H is the distance from the top of the rope to the top of the aluminum angle in blocking position.

At this stage you can deduce the 4 values of E according to H, ie E1, E2, E3 and E4 with:

E = H - 18

E is the distance from the top of the square to the top of the rope (see diagram above). Calculate and record the value of A for the first hammer of mediums M3, ie A3 with:

A = H - 10

This value A3 will be useful for drilling the horn of the frame at low midrange where appropriate.

Fixing the brackets.

You can now temporarily place the oval brackets, value E1 for the first bass bracket about 30mm from the dam (photo 1), E2 for the second at the low midrange in the case of a frame without horn, then E3 (photo 2) and finally the last with E4 at 20mm from the dam, this square will sometimes have to be cut and ground by twisting to fit the pediment (photo 4). Use to measure E the tail of a caliper whose base is placed on the top of the rope. Place the brackets 2 and 3 to the right of the tonal pedal support (photo 2). Point and drill with a 3mm drill in the center of the oval. Secure the brackets with a single 4x16 screw for now.

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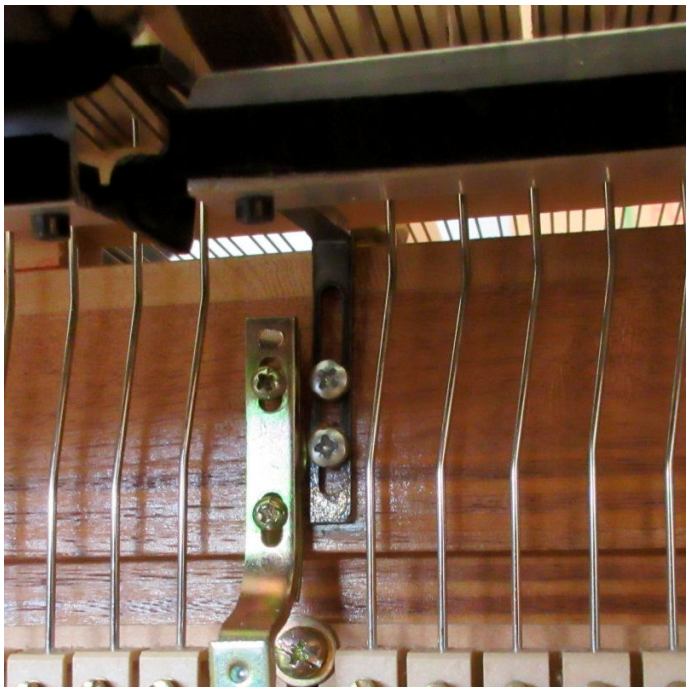

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If the frame has a horn in the way (photo 3), a plate will be used instead of the square. Mark with the felt on the rope the point of impact by bringing the hammer M2 on the rope, measure the width L of this hammer (see diagram), mark on the frame the distance L / 2 (half hammer) + 10mm from the point striking (value D on the diagram), mark with the felt on the horn a vertical line from this point. Then use the tail of the caliper, base placed on the top of the rope to mark a horizontal line value A2 previously calculated. The intersection of the 2 lines will be the location of the axis of the blocker.

The wafer will be used as a drilling template, tighten the wafer with an attached clamp, center hole centered on the intersection of the lines (photo 3). Drill with a 7mm drill, then replace the clamp seal drill with a 4mm drill in the center of the 2 ovals. Drill the 7mm hole with a 12mm drill bit to keep a margin of adjustment of the locking point. Insert the rubber grommet in the center of the plate. Fix the plate with the 2 screws plus nuts 4x20 with washers on both sides of the plate as well as nut side, thin face of the wire pass side horn. If the last bass hammer is close to the horn, remove the protruding part of the nut.

Adjust and tighten temporarily the axes of each square, knowing that in the low the axis of the blocker is about 10mm from the hammer, against in the treble must be closer to the nearest to allow the release of the rotary blocker. Place the mechanism in the piano and make sure that no hammer hangs the brackets, if necessary, remove the square and offset it to the vises by folding side to its base (photo 5).

Once the brackets are in place in the piano, place the aluminum angles between each square, mark with felt to cut them to the required length. The angle coming to the edge of the rubber thread on the left side, and leaves closer to the square to the right without touching it in rotation, see photo 8 to understand the markings to be made. The hole for tightening the black shaft clamp is on the vertical flange of the angle in the locking position, you have in the kit an angle already pierced right for the bass, a left for the midrange, and the last right for treble. Then saw the angles on the not pierced side, drill with a drill of 3mm the end using another square already pierced opposite as drilling template by placing them flush with vises vis-à-vis (photo 6) .

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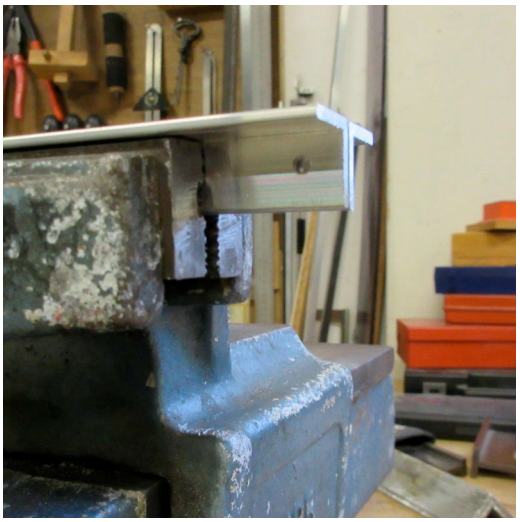

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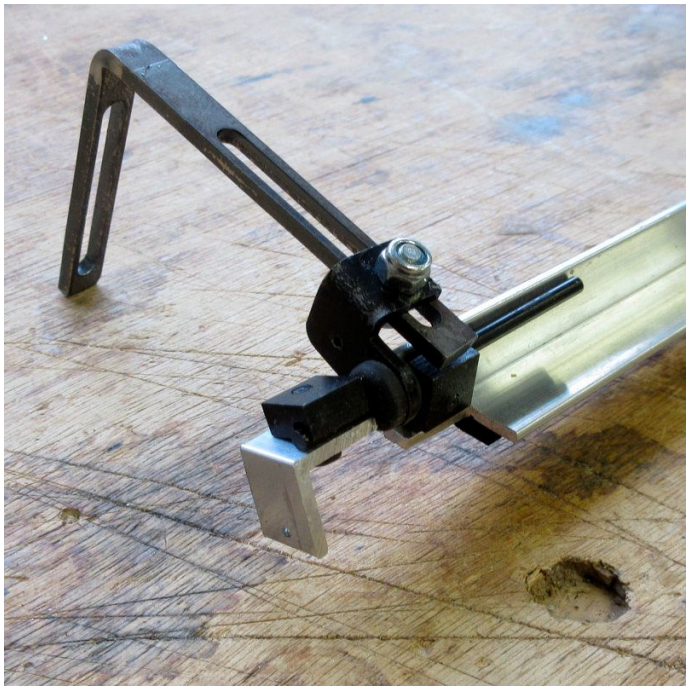

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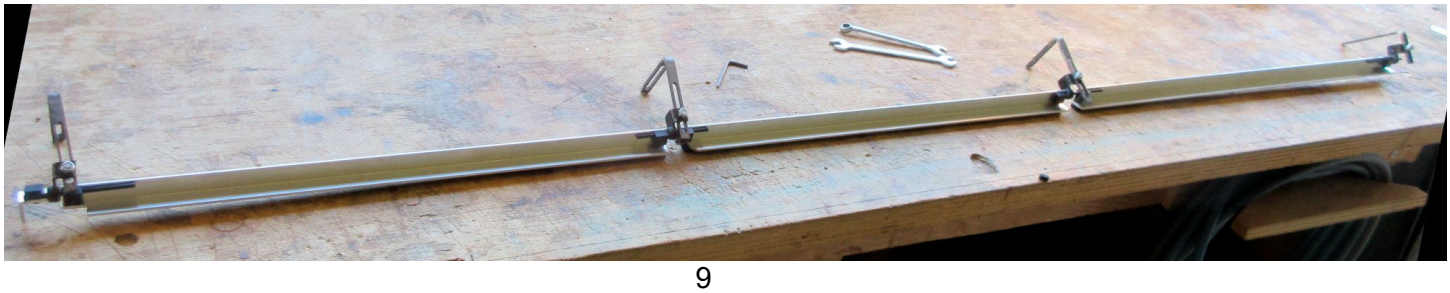

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Remove the brackets and mount the complete blocker assembly (photo 9). First, tighten the pin in the groove of the shaft clamp, then firmly tighten the locking screw (Allen key 2.5), making sure that the axis is straight with respect to the angle (photo 8). Place the control bracket at approximately 30 ° to the vertical (photo 7). Glue the rubber bands to the neoprene glue. To replace the blocker, in the case of a frame with horn, the assembly is done in 2 parts, low and medium treble, the axis of the basses at the level of the horn tightening in the piano. Adjust the locking point of the sliding calipers with the value H, if necessary, an

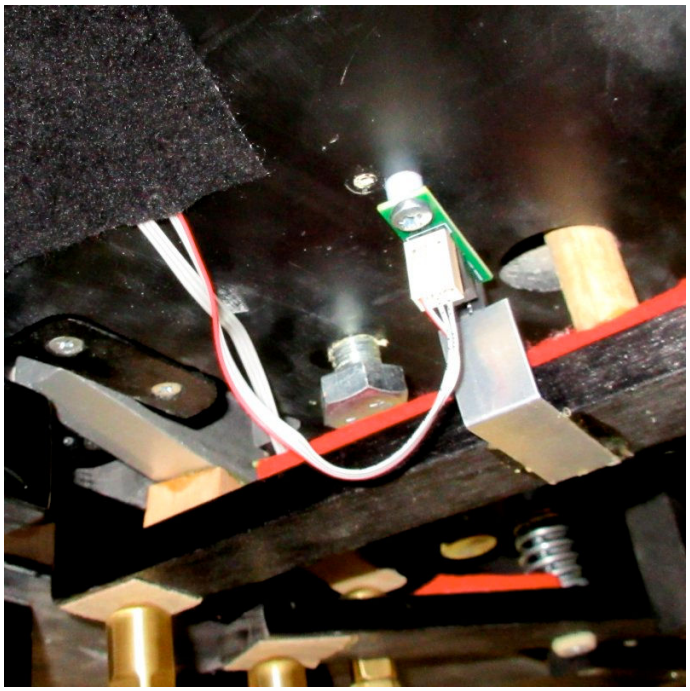
accurate final adjustment can be made by marking on the pediment and rectification of the position of the brackets. Doubling to finish the fixing screws of each square for more strength.

Install the control lever.

Take marks on the outside of the piano, with respect to the front of the board and width of the side, drill from below, drill 6mm with an angle of about 30 ° to the front of the piano, the sheath to go out slightly inclined and ideally closer to the side of the piano, see photo 1 above. Fix the lever under the plate with 2 4x16 screws and 3mm drilling (photo 13). Bend the end of the rope at a right angle to 1cm, insert it through the 2mm hole of the angle control lever, adjust the correct lateral twist so that it stays in place naturally in the lever.
The run of the angle must be 90 °, moreover, the rubber must be horizontal in the locked position. Fasten the aluminum retaining collar of the sheath, adjust the ideal stroke by moving the sheath in this collar. If necessary adjust the angle of the control angle, the optimum effortless travel is achieved with a 135 ° rope angle (see photo 1). The angle must never come into abutment on the frame at the end of the race, otherwise the race may be out of order, so if the race is too important, place the black stop spacer on the race of the lever. For safety, add a second collar next to the first, firmly tighten the 2, the sheath must remain perfectly immobile at this place to avoid any misalignment of the race. Fix the sheath under the piano with the remaining collars.

Installation of pedal sensors.

The sensors are placed closest to the pedal levers where the stroke is about 1cm, set on spacer, 4x16 screws and 3mm drilling. Glue the aluminum strip to the neoprene glue after folding to the correct length, ensure that the aluminum strip is properly centered on the optical fork, and the aluminum must not touch the fork at the end of the stroke.



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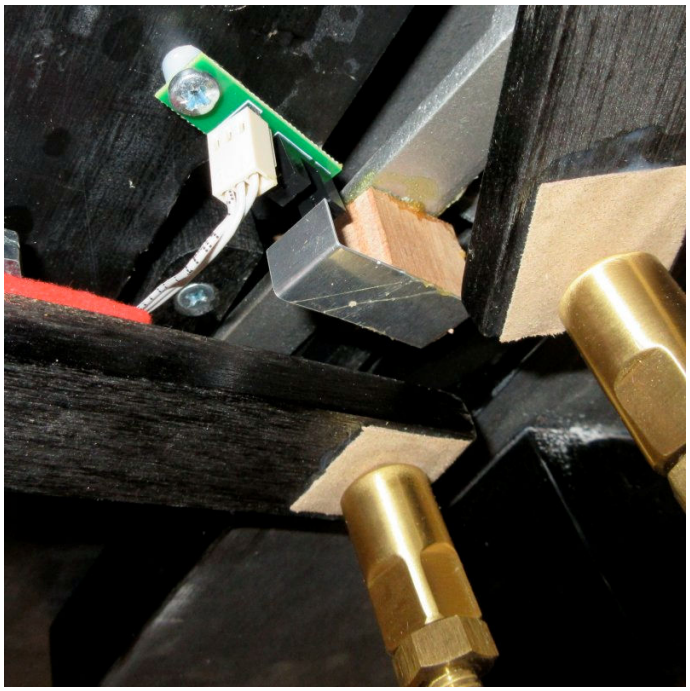

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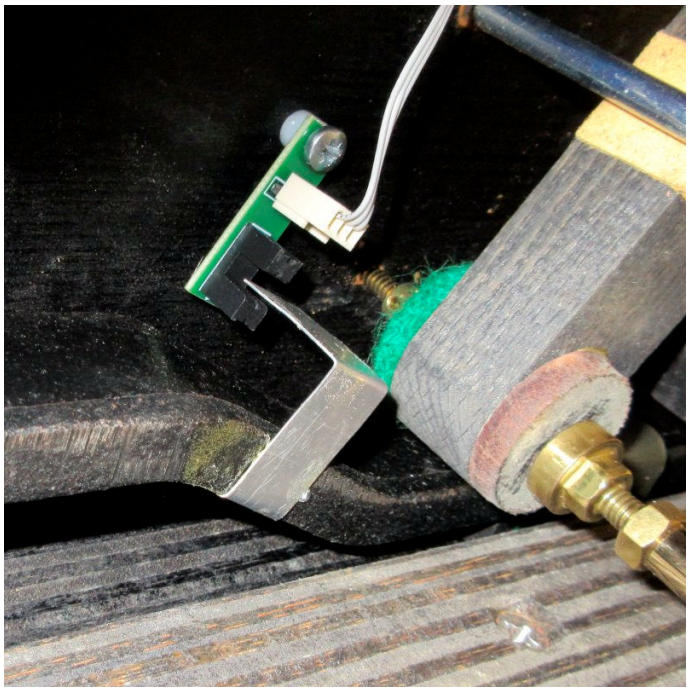
La photo 10 montre une installation typique sur pédale forte, pour le type de pédale douce de la photo 11, l'ajout d'une cale en CTP sur le levier est nécessaire. Connecter le câble en nappe 1x6 pour les 2 pédales, le fil rose indiquant la pédale forte. Les 2 petits décrochements sur une face du connecteur beige sont coté capteur, si le branchement est inversé la pédale ne fonctionnera pas. Utiliser l'adhésif pour fixer les câbles



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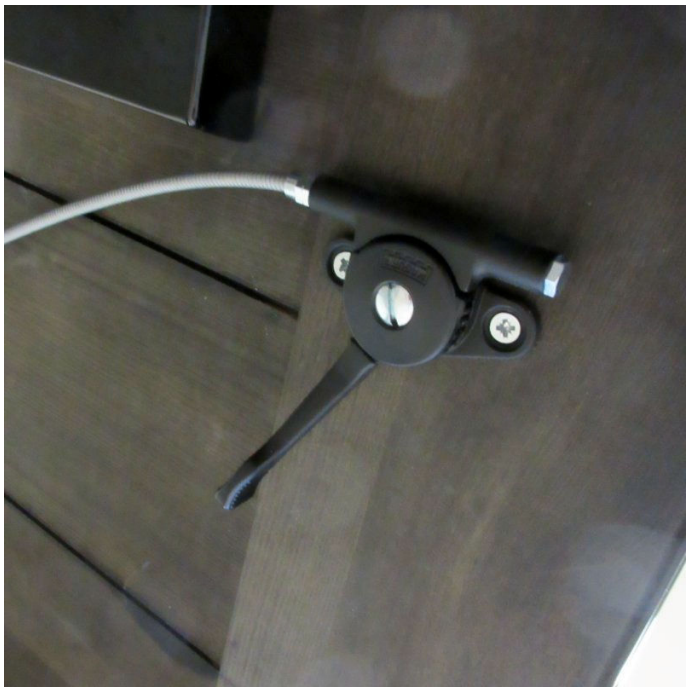


13

The picture shows a soft pedal sensor on cast iron lever, the aluminum strip is glued in L to the neoprene glue on the back side and the bottom.

-Installing keyboard sensors.

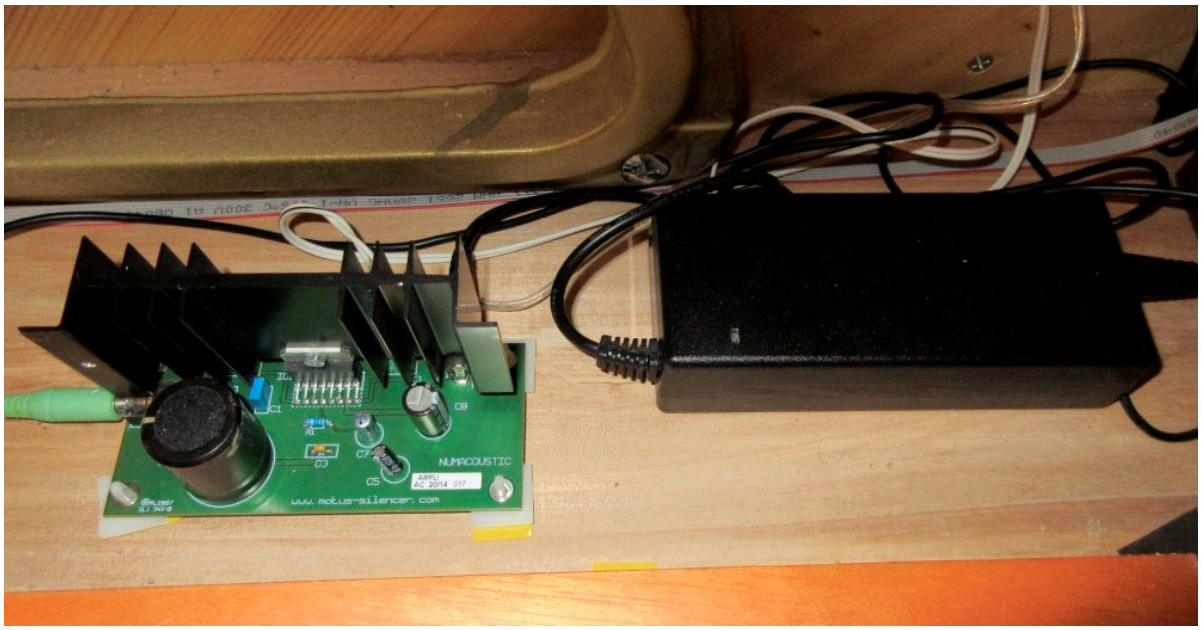
The principle of laying the sensor rail as well as the dynamic adjustment protocol are identical to the upright piano (see the beginning).

The casing attaches to the right under the keypad, to the left of the right foot for easy connection of the power cable. Make a 10mm hole in the treble space beyond the keyboard frame to pass the sensor cable to the case. Stick this cable on the right side of the piano, above the pedal spring of the soft pedal by a strip of adhesive felt, leave enough slack to easily disconnect the cable at the sensors by slightly removing the mechanism.

You can also introduce the excess length of the pedal cable through this hole for more discretion and seal with a strip of felt.

- Numacoustic option -

-Amplifier and power supply.



On an upright piano, the amplifier and the power supply can be placed in the bottom of the piano on the right, in this case it will be necessary to drill in the handkerchief of the soundboard for the passage of the cables. It is also possible to place them outside on the base of the barrier if you want to avoid piercing the handkerchief area, in this case the audio cable will pass outside the piano. On a grand piano these two elements are placed on the dam on the front part between the last beam and the belt.

The amp has columns with adhesives, the power supply can be glued with Sader type glue "Fix without drilling 100% materials". Use the adhesive jumpers and the adhesive felt for cable passage.

Be careful not to reverse the 18 Volt power supply with that of 9 Volts of the Motus muffler, the tip being identical, the Numacoustic label is on its power supply.

By removing the connection cables from the vibrators, locate the right (right) and left (left) channel inscribed on the amplifier board near the output connectors.

Place the Numacoustic ON / OFF switch under the keyboard next to the Motus box, connect it to the vertical plug K1 on the amplifier.

Connect the line output of the Motus silencer located next to the headphone socket to the line input of the amplifier using the cord provided. To turn off the assembly, it is advisable to first turn off the Numacoustic, and 3 seconds later the silencer, to avoid a small parasitic noise, and vice versa for turning on the power.

-Vibrators installation.

Seen from the back of the piano, photo above, the 2 vibrators of the right channel are placed at the top left, the first between bar no 2 and no 3, the second between bar no 3 and no 4. Locate the location of the bridge using the axis of the soundboard buttons, and place the 2 vibrators on either side of the bridge, this for better acoustic transmission.

The 2 vibrators of the left channel are placed more towards the center for a better elasticity of the point of transmission, these vibrators being concerned mainly by the low frequencies. The first is generally between the bar no 6 and 7 and the second between the bar no 7 and 8. They are also placed if possible on either side of the bridge.

A very strong adhesive ensuring optimum sound transmission is used, remove the protective film for fixing.