

# **Fandrich Vertical Action™ Regulation©**

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## **FVA Features**

- Hammer return springs of near gravity strength
- Key weight(s) in played end of key
- Repetition springs connecting jack to backcatcher shank

The force of gravity on the key weight(s) opposes the hammer return spring, keeping the parts connected during play. This eliminates the need for a bridle tape and gives the FVA the tight, responsive feel of a grand action.

After key release, the traditional wippen/key assembly returns—falls—considerably faster than the hammer assembly to enable quick, reliable re-engagement. A consequence is that the jack most often overshoots, creating a lost motion gap to be closed by repeated play. The FVA played end key weight reverses the traditional balance of the key/wippen assembly so the jack is forced toward the hammer assembly, preventing the formation of any lost motion gap. A repetition spring is therefore needed to force re-engagement.

After several hundred hours of play, the FVA, like all piano actions, will need some regulation to restore proper function due to settling of the various felt and leather cushions. There are seven steps to FVA regulation. The **special tools** and **sequence of steps** are important for efficient and accurate work.

## **Regulation Steps and specifications**

1. **Key height/level/dip** (Dip:10mm at a point 10mm from key end)
2. **Blow distance/hammerline** (42-43mm)
3. **Letoff** (3mm)
4. **Checking-Reconciling** (12-13mm tenor-treble, taper bass to 10mm at A1)
5. **Hammer return springs** (touchweight: 52g ± 2)
6. **Repetition springs** (somewhat slower than a grand)
7. **Damper timing** (½ blow distance)

### **Step 1: Key height/level/dip**

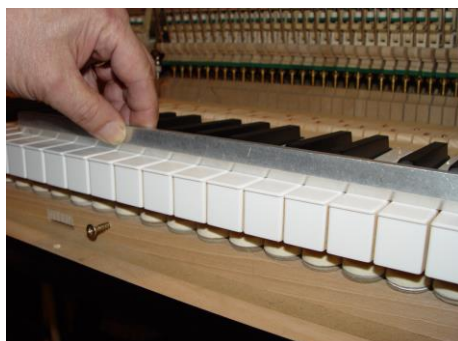
- **First, check average dip.** On a played-in FVA it is normal to find the dip slightly deep on average combined with a long blow distance due to back rail settling.
- For FVA's in pianos made by Feurich and Fandrich & Sons (Klima/Bohemia), adjust the average dip by gluing a shim(s) to the backrail support (see pictures below), which will reduce the dip by slightly lowering key height. A 20 x 50mm piece of 1mm thick card makes a good shim. This adjustment will also partly correct the long blow distance.



- For early FVA actions (Fandrich U122 manufactured by Del Fandrich, Pearl River—marked Fandrich & Sons—and Wilh. Steinberg pianos), the backrail is supported by the soft pedal mechanism. Adjust by turning the nut on the pedal bolt or by adding a balance rail punching shim to the lift rod.
- This adjustment reduces deep dip by restoring the key height, which is usually about 18-20mm above the keyslip.
- The **FVA Dip Block** is 10mm thick and is not tapered. Therefore the dip is 10mm at the point where the block is level with the adjacent key. The dip specification is for this point to be about 10mm from the end of the key (see picture) but may vary a few millimeters for purposes of reconciliation (see Step 4 below).

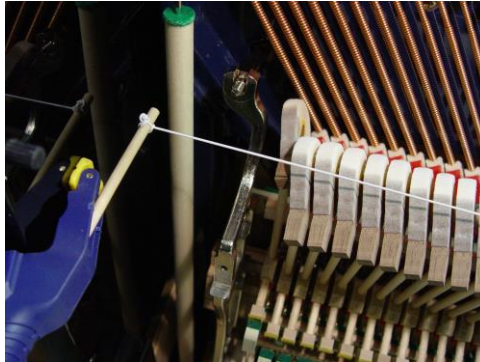


- Check key level. Use a straight edge to tap the keys while watching the hammers. High keys will move their hammer first, low keys last.



## Step 2: Blow distance/hammerline (40-42mm)

- The **Stretched String Standard** is an elastic cord stretched between two ¼” dowels fitted to holes drilled into spring clamps (**Irwin 58300**).
- Mount a light directly overhead to cast a shadow on the hammer moldings as shown in the photo. To adjust, slide the string loop along the dowels. This shadow provides a standard that makes possible very accurate and rapid hammerline and checking/reconciling adjustment.



- Use the **FVA Dip Block** as a gauge. The gauge is 40mm. For a slightly longer 42mm blow distance, use the block at the hammer heels.



- Adjust the string shadow to fall near the edge of the hammer heels.
- Choose a blow distance that reconciles (see Step 5 below) with a 10mm dip at a point 10mm from the end of the key. Usually 40mm is best.
- The soft pedal should advance the hammers about 1/3 (12-14mm). If excessive, add a felt shim beneath the pedal to limit travel.

## Step 3: Letoff (3mm)

- The **FVA Dip Block** is also a **Single Hammer Letoff Gauge** (pictured, below right) that supports the hammer(s) at 4mm from the string. Adjust letoff to lift or bump the hammer about 1mm off the gage for a 3mm letoff.

- Pictured below left is the **FVA Four Hammer Letoff Gauge**. Support the gauge with a finger while cycling the wippen with the thumb and operating the letoff tool with the other hand.
- There is no advantage in closer letoff. If set closer aftertouch will be reduced and “bobbling” hammers may be a problem.



#### Step 4: Checking (13mm) and Reconciling

- Adjust checking by bending the back check wire and immediately reconcile.
- Use the **FVA Dip Block** width (13mm) as a gauge (see picture)



Shadow Adjusted for Checking



Renner Check Bending Pliers #1602

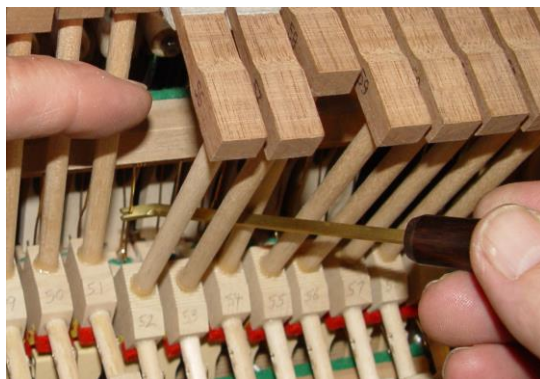
- Most useful are Renner Check Bending Pliers (Renner USA, Part No.1602, [www.lloydmeyer.com](http://www.lloydmeyer.com))
- **Reconciling** is the test/adjustment for aftertouch.
- A useful way to think of the FVA (or any piano action, grand or upright) is that it consists of two levers (key, hammer) with a connecting/disconnecting part (wippen) in between.
  - ◆ Each lever has a stroke.
  - ◆ Each stroke has a starting and stopping point.
  - ◆ The key stroke starts at **key height** and stops at **key dip**.
  - ◆ The hammer stroke starts at **blow distance** and stops with the **beginning of letoff**.



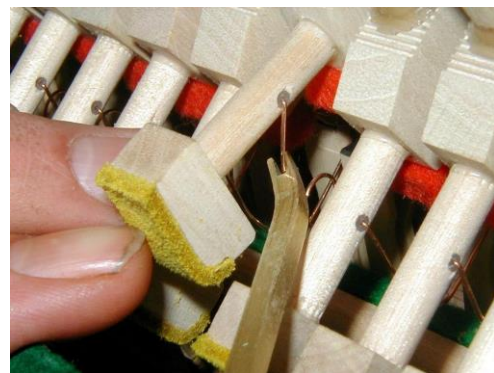
- ◆ By design, if these starting and stopping points are correct, **aftertouch** should be sufficient for the jack to fully escape yet still be in virtual contact with the knuckle/butt leather.
- **To reconcile:**
  - ☛ Play a key *mf*, and then push the hammer forward out of check while watching the jack for movement.
  - ☛ If the jack remains more or less stationary, or slightly pulls away from the knuckle, the aftertouch is optimal.
  - ☛ If the jack follows, or moves toward the strings, aftertouch is not adequate: check for too little key stroke (insufficient dip or low key) and/or too much hammer stroke (narrow letoff and/or excessive blow distance).
  - ☛ If the jack pulls away, check for excessive key stroke (deep dip or high key) and/or too little hammer stroke (wide letoff and/or short blow distance).

### **Step 5: Check Downweight**

- Each key is weighted to press the capstan up against the wippen. This "up-force" is opposed by a hammer return spring which is adjusted by bending for a touchweight of 52 ( $\pm 2$ ) grams. Bend the spring at a point about 1/3 down from the coil. Use a **FVA Spring Bending Tool**. Hold firmly and gently pull or push to bend the spring.
- The touch weight is correct when a 54g weight placed on the key end will move the hammer slowly to a point about half way to the strings.



**Adjusting Hammer Return Spring**



**Adjusting Repetition Spring**

### **Step 6: Repetition Spring**

- To check repetition spring adjustment, play the key and pull the hammer back about 2/3 from the string to block the jack against the small rebound felt on the hammer butt. Then release the key slightly. The hammer should advance at a speed slightly slower than a grand in the treble and still slower in the tenor and bass.

- Adjustment is made with a slight bend to the upper arm of the spring. Bend the spring at a point near the middle of the arm. To bend the spring, firmly hold the spring bending tool and gently push or pull.
- From the checked position, the hammer should advance no more than about half-way to the strings.

### **Step 7: Damper timing**

- First, check/adjust for even sustain pedal damper lift.
- Adjust damper lift to  $\frac{1}{2}$  blow distance.
- Accurate damper timing is **crucial** for a good touch.
- Pedal lift should equal or slightly exceed spoon lift.
- For ease of finding and bending spoons the Renner spoon bending tool is unsurpassed (Renner USA, Part No.1565, [www.lloydmeyer.com](http://www.lloydmeyer.com)).

