It is very important to make the adjustments to these clocks in the right order. There are some points that must be correct to start with, and these are easily established.

**Centre the pendulum adjuster.**

Put the balls or pendulum weights in the mid-point of their adjustment in and out. You can use them later for final timekeeping adjustment either way.

**Place the base on a firm level surface.**

If adjustable feet are fitted, use them to ensure the bob hangs directly over the centre of the base.

**Check the gap between the fork and impulse pin.**

The gap between the tines of the fork and the impulse pin is very important. This should be as little as possible, but enough to ensure it does not bind. The most likely position for binding will be at the point of maximum rotation. At this point, the tines are still horizontal, but the effective width of the pin has increased, being at an angle. Too much gap will result in lost power and make escapement flutter more likely.
Put the pendulum in beat.

The clock is in beat when the number of degrees of rotation from the stationary mid-point to a ‘tic’ is the same as the number of degrees from the mid-point to a ‘toc’.

To check and adjust the beat, start by photocopying the beat scale at the end of this document.

You can photocopy this for your own private use.

The beat scale consists of a circular printed scale and five marker arrows.

Using the photocopy, cut around the outside of the circle. Remove the shaded area if a pendulum locking device will obstruct the scale. Now cut out the five marker arrows.
Tape the large black arrow in any convenient place on the pendulum. It will be easiest if you tape it near the front, as adjustments are most easily made at the back of the clock, and this is where the arrow will be swinging to when the clock is running.

With the clock stopped and the pendulum quite still, place the scale beneath the pendulum, with the black arrow aligned with the arrow secured to the pendulum. Secure it in place with more masking tape. If you have had to cut out the centre of the scale to avoid any pendulum locking device, be sure to tape down the edge.

Now rotate the pendulum no more than 1 1/2 whole turns and let go gently. Allow the clock a few minutes to settle down.

The reason for the four remaining paper markers is to help keep a note of four points during rotation.

The two ‘swing’ markers are to show the maximum distance the black arrow swings, clockwise and anticlockwise.

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The position of the ‘tick’ markers show the two points during the swing when the escapement ticks.

Start by putting the ‘swing’ markers in position. Make sure you use the correct ones, referring to the direction indicators printed on them. This will help on clocks with more than a full turn of rotation. Simply use the marker with the direction arrow showing the direction of rotation. Put them at the point when the pendulum stops and begins its return.

The ‘tick’ markers are not so easy to place, as you need to look in two places at once! Watch the escape wheel, or listen very carefully for the sound, and put the ‘tick’ markers exactly at the point the ticks occur.
An electronic beat amplifier is a great help with this job. They generally have a delicate crystal pickup connected to an amplifier. The pickup senses the mechanical vibration of the ticks, which is then amplified. However, just by watching a few turns of the pendulum, you will soon be able to place the markers by eye.

Note the position of the four markers on the scale. At this stage we are not concerned with the amount of rotation, but the ‘Tics’ and ‘Tocs’ and the maximum swings should be an equal distance from the fixed black arrow on the scale. If they are not the same, the saddle that supports the top block must be rotated slightly. The actual rotation required is very small and is best done with a beat setting tool. This can remain fitted to the saddle while adjustments are made. Because of its length, very small changes can be made. However, you can make the adjustments with any smooth jaw pliers or other clamp arrangement.

If the clock is out of beat, you will see a difference between the amounts of overswing. Overswing is the distance between the tick marker and its corresponding swing marker. If badly out of beat, one direction may have no overswing at all, and this is what makes a clock stop. The slightest vibration, extra friction in the train, a sticking mainspring, and the pendulum will not make it to the tick position.
No tick means no impulse energy back, so next time there is even less chance of a tick.

This is all because the wire is biased towards one tick more than the other.

Make small adjustments to the saddle, and move the four markers around accordingly. The saddle (not the tail of the tool) has to be rotated in the direction of the marker with the least overswing.

Trial and error will soon get the ticks and swing equal. Leave the scale and markers in position. You will need them later to check the amount of rotation.

Don't be surprised if, next morning, the overswings have increased considerably. This is the sign of a properly adjusted and free running clock.
Check the height of the fork.

If you have purchased a new suspension unit, the fork height should be correct. There is no specific ‘correct point’ that can be easily described, but it must be high enough to stop flutter at the central position. Flutter occurs when the fork is so low down the pin that hardly any twist of the torsion wire occurs between ticks. As the fork passes the mid-point, one or more extra ticks can take place. This often accounts for mysterious and rapid gain in timekeeping when everything seems correct. If too high, it will prevent the escapement from working properly and stop the clock. It may be some time before the clock actually stops, as the extra momentum given it by you to start it can take some minutes to disappear.

Check the amount of rotation.

Using the same scale as before, watch how far round the black arrow rotates from the mid-point to the ‘tic’ and ‘toc’ markers. These, if you have completed the beat setting procedure, will now be equal. 270 degrees is the standard rotation, but more will not normally be a problem. Up to 1 1/4 turns is fine. Less than 270 degrees normally means the clock will stop after a while. To increase the rotation raise the fork slightly, provided this does not interfere with the
Use the scale to check the amount of rotation.

proper operation of the escapement action. If that fails to increase the rotation sufficiently, there is a loss of power somewhere. The pendulum is not getting the impetus needed to give it a healthy turn. Check the gap between the tines of the fork again. Too much gap allows the pin to move without actually pushing the fork. Go back and check the whole train. Look for hands that are too tight, a sticky mainspring etc.

The rotation from the mid-point to a ‘tic’ must be the same as from the mid-point to a ‘toc’.
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