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## Regulating your 400-day (anniversary) clock

### Regulating the Clock

On 3-ball and 4-ball pendulums, a round, knurled "regulating disc" (about the size of a nickel) is at the top. When turned, it will make the balls go toward, or away from, the center of the pendulum. The direction in which the regulating disc should be turned to make the clock go faster or slower depends upon the design of the pendulum. Look for the letters F (fast) and S (slow) on top of, or near, the regulating disc.

On disc pendulums of pre-World War II clocks, there are two little disc weights which can be moved by turning a threaded steel rod with a key. They will go toward the center of the pendulum (turn key toward F or A to make the clock go faster) or away from the center (turn key toward S or R to make the clock go slower). A double-end key for both regulating and winding is available for this clock. It can be obtained from your Clocksmith.

### Manual Timing

Assuming the clock is in beat and you have at least 1" total overswing (1/2" in each direction), now it's time to "time" the clock.

All clocks will regulate differently for different pendulum swings. The "normal" pendulum swing (amplitude) must be established before you can time the clock. For 400-days, this means that the clock should be running for at least 15 minutes which will allow the pendulum to "find" its normal amplitude.

Once accomplished, then find the exact unit from the Repair Guide in Section 10. Take a look at the Beats per Minute information. We'll assume that you are using # 1 of Section 10. This calls for a .0032" suspension spring and the clock should be running at 8 beats per minute.

Use a beat amplifier and a stopwatch. Place the alligator clip of the amplifier as close to the pallets as possible and "clip" it onto the clock plate. Start the stopwatch at exactly the same time as the audible "tick". Then start counting the ticks using the next tick, the tick following the start of the stopwatch, as tick number one. When tick number 8 is reached, stop the stopwatch as exactly the same time as the audible tick. You could also install the minute hand

and use the motion of that hand as your tick. But again, make sure the clock has reached the proper pendulum amplitude before you start timing.

The stopwatch should read exactly 60 seconds when the eighth tick (in this particular example) is reached. If your reading is less than 60 seconds then the clock is running fast and must be slowed and if your reading is over 60 seconds then the clock is running slow and must be sped up.

When making these adjustments to the pendulum, please observe the total swing of the pendulum because you can start the pendulum at the point of the normal amplitude and speed up your timing process.

### Electronic Timing

The best thing about using electronic timing is that you do not have to place the minute hand on the clock as you may have to do with manual timing (above) and accuracy is greatly increased.

By far the easiest way to time a 400-day is the use of an electronic timer. The timer must have a reading of at least 2 decimal places to the right after the decimal point. Most timers read in beats per hour and you need to know the number of teeth on the escape wheel, so you can "set" the preset average (or the amount of "counts" you are telling the timer to register). Take the number of escape teeth and multiply it by 2 because each escape tooth "hits" the two pallets of the fork. The reasoning is that electronic timers measure one complete revolution of the escape wheel.

Place the alligator clip of the timer as close to the pallets as possible and "clip" it onto the clock plate. Set the preset average, or counts, to the escape wheel teeth times 2 and record your results after the timer has updated its readout at least twice.

Using the same example as above, 8 beats per minute, then a perfectly running clock will read 480.00 beats per hour. If your reading is less than 480.00 then the clock is running slow and must be sped up and if your reading is over 480.00 then the clock is running fast and must be slowed.

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Mike Murray Founder of Clocksmiths

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