

# Chronographs

## Post-Service Adjustments

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The following is an extract from the New BHI Professional Grade Learning Course, chronograph section. The figure references relate to the full article that will be available when the new course is complete. We hope this extract will inspire new contributors.

These notes are general and may vary dependent on the calibre. Please refer to the manufacturer's technical guide if available.

As a general rule, none of the minute recording parts should be lubricated, including pivots. The only exception being the minute recorder hammer face.

Before assembly, set the centre seconds friction spring. The tip of the spring is usually approximately 0.6mm from the top plate, **Figure 1**. A 0.6 screwdriver can be used as a gauge.

During assembly, fit the driving wheel (friction tight) on the extended fourth wheel pivot, ensuring the driving wheel and clutch wheel are level, **Figure 1**.

After the full assembly of the chronograph mechanism, begin with the depth and position of the sliding gear and chronograph finger. To ensure minimum friction and loss of amplitude during the advancement of the minute recording hand, the chronograph finger and sliding gear must be positioned as deep as possible, **Figure 2**. This ensures that the finger engages approximately on the pitch circle of the

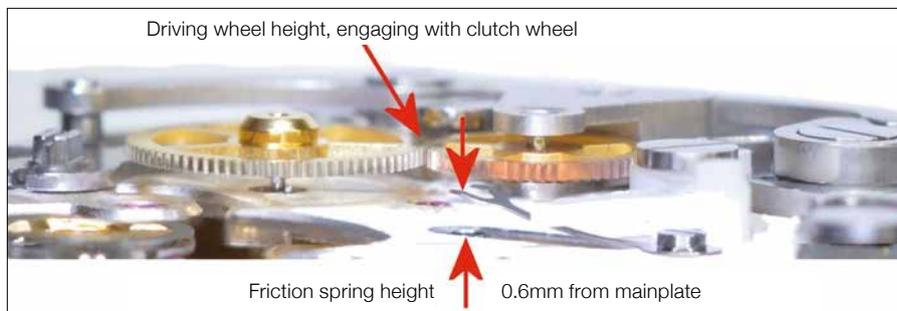


Figure 1. Adjusting height of chronograph friction spring and height of driving wheel.

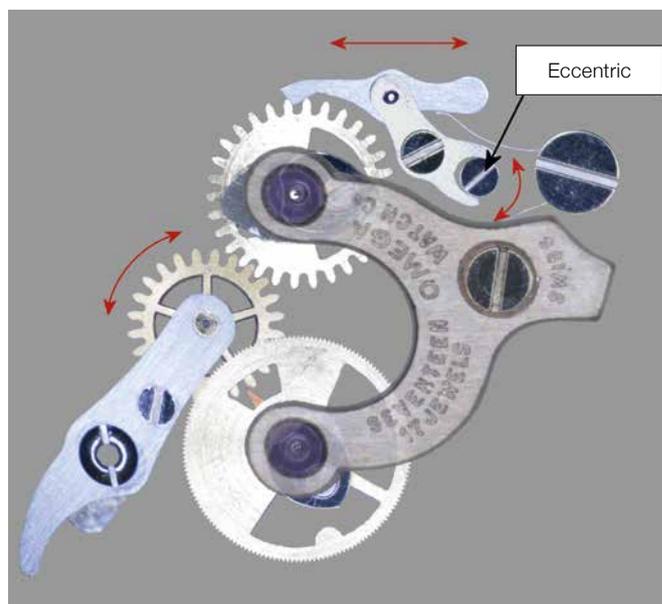


Figure 3. Omega 320/Lemania 2310 minute recorder with adjustable jumper - adjusting position of minute recorder jumper and sliding gear wheel.

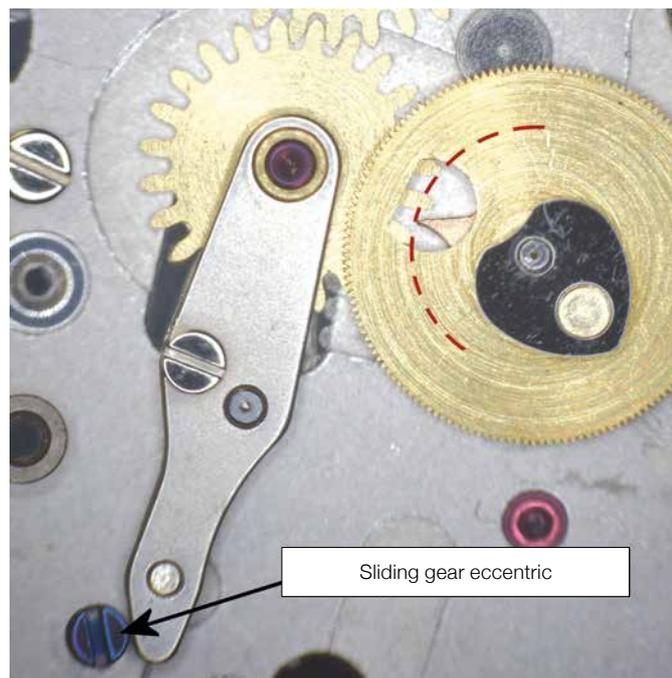


Figure 2. Depth of sliding gear adjustment.

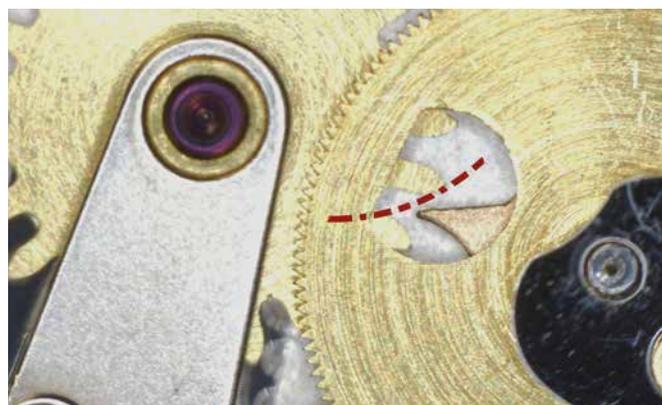


Figure 4. Path of sliding gear during engagement.



Figure 5. Position of finger at zero.

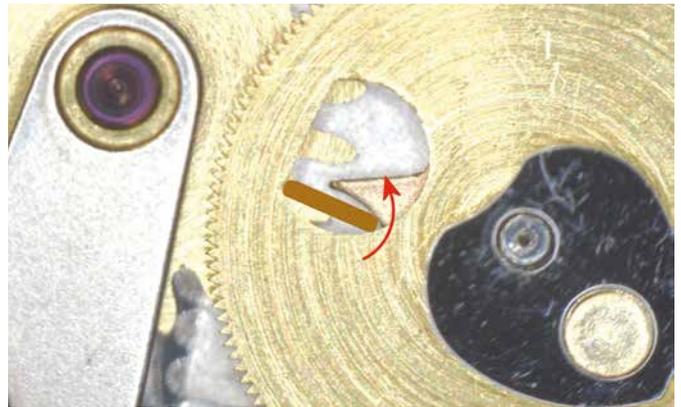


Figure 6. Adjusting the position of the chronograph finger.

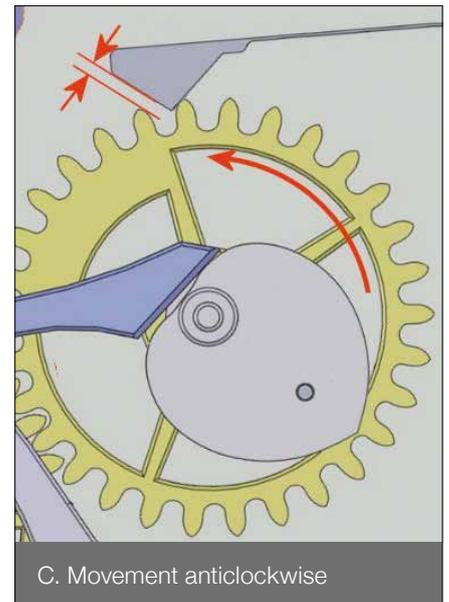
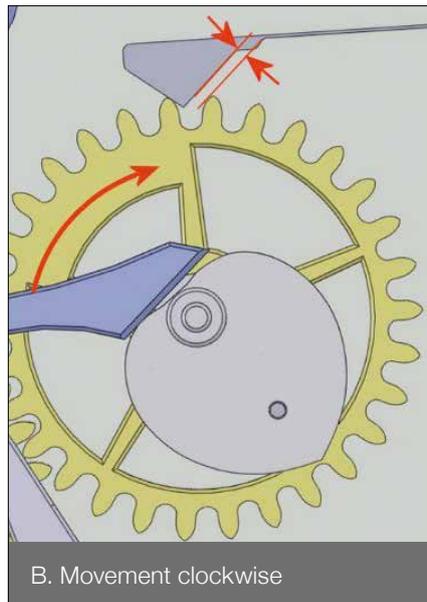
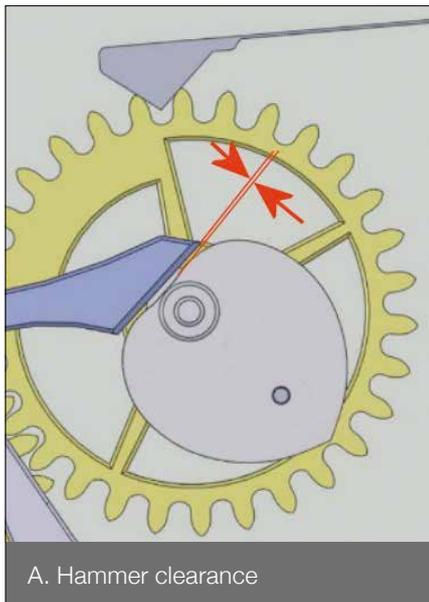


Figure 7. Clearance of the hammer and minute recording heart cam.

sliding gear and can be achieved by adjusting the sliding gear eccentric.

The minute recording jumper in some chronographs can be adjusted, **Figure 3**. In conjunction with the above adjustment, the position of the sliding gear can be set so that the tip of the chronograph finger safely passes the tip of the tooth prior to the intended tooth to be gathered. The gathered tooth will move forward and complete the action at precisely the 60th second and the finger will exit.

It is permissible for the finger to brush the tooth of the sliding gear on exit, without causing the minute recording wheel any further movement after the required action is complete. This would be undesirable to the user as the hand would seem to move after completing the recording of the passing of a minute.

In chronographs, where the chronograph finger is not spring loaded or flexible, the sliding gear must move clear of the finger during the zero action. One should check the clearance of the teeth of the sliding gear as it re-positions during the start procedure. Because the minute recording jumper holds the minute recording wheel in the correct position, the sliding gear must turn as it returns to the running position. One should ensure the chronograph finger is not fouled, as this often causes the sliding gear to move the minute recording

wheel, forwards or backwards and an incorrect record of elapsed minutes to be shown on the dial. See **Figure 4**, the path taken by the tooth of the sliding gear.

The position of the finger in relation to the heart cam should be adjusted so that the finger is midway between two teeth of the sliding gear (the one laying on the centre line with the runner, to be gathered after one revolution of the runner and the adjacent tooth, clockwise of the centre line) **Figure 5**. This adjustment ensures the minute recording wheel under the influence of the jumper, jumps to the next recorded minute exactly as the centre second hand, attached to the runner, passes the zero mark on the dial, thereby removing the possibility of a reading error.

Adjustment is achieved using a soft brass (or silver) screwdriver-shaped tool in the inspection hole, using a gentle twisting action, **Figure 6**. This can be counter-adjusted from the other side of the inspection hole.

Having completed the previous steps, the hammers can be adjusted if necessary. This is essential if new hammers are fitted.

The hammers should hold the seconds recording heart cam firmly on zero while the minute heart cam should be free to turn slightly either side of zero but less than one half of a tooth space, as shown in **Figure 7**. The small gap is left

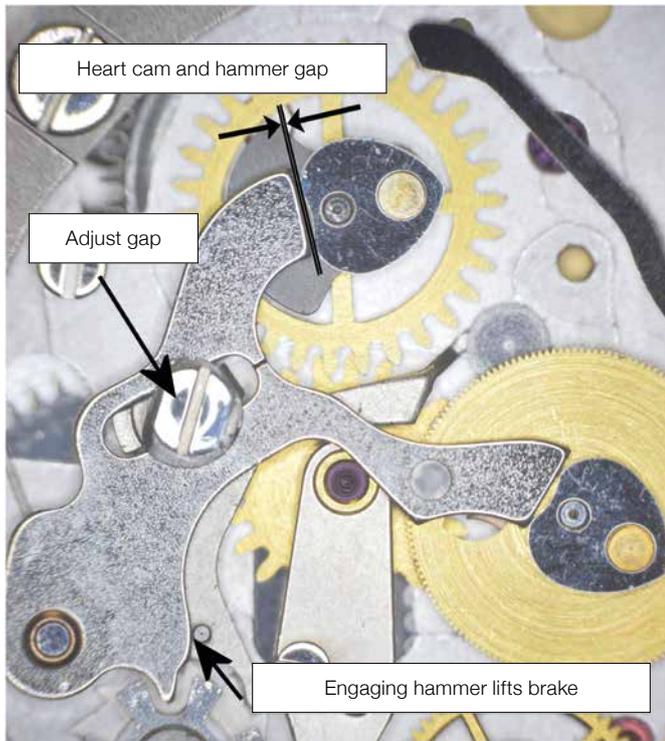


Figure 8. Adjusting hammers.

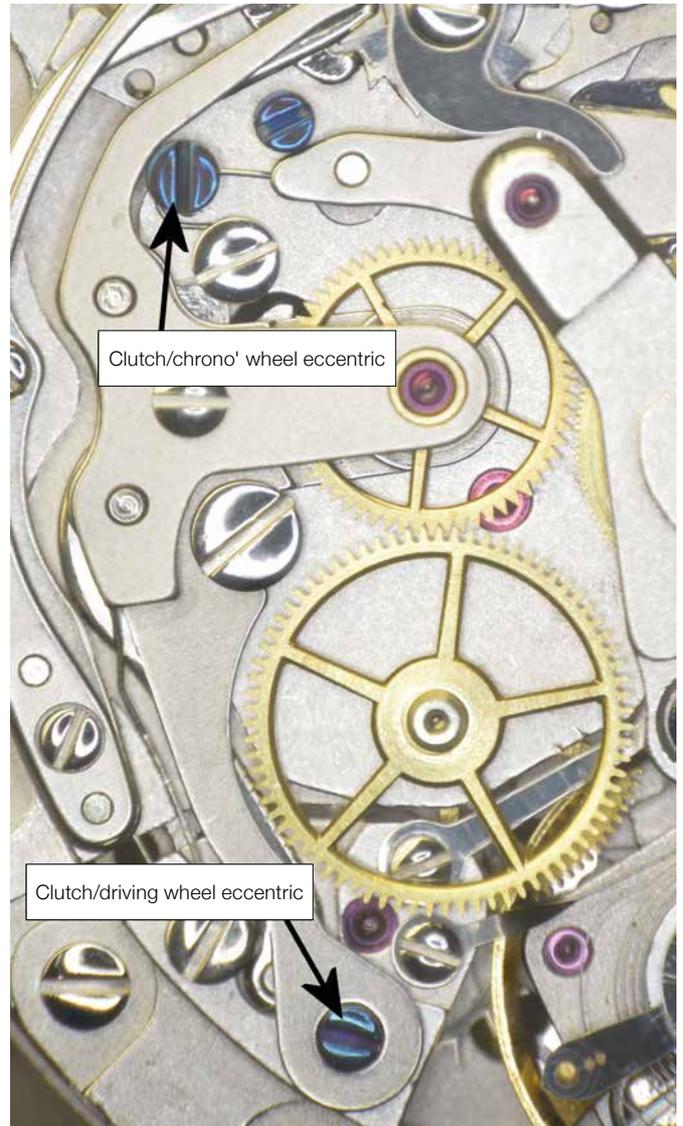


Figure 9. Wheel adjustment eccentrics

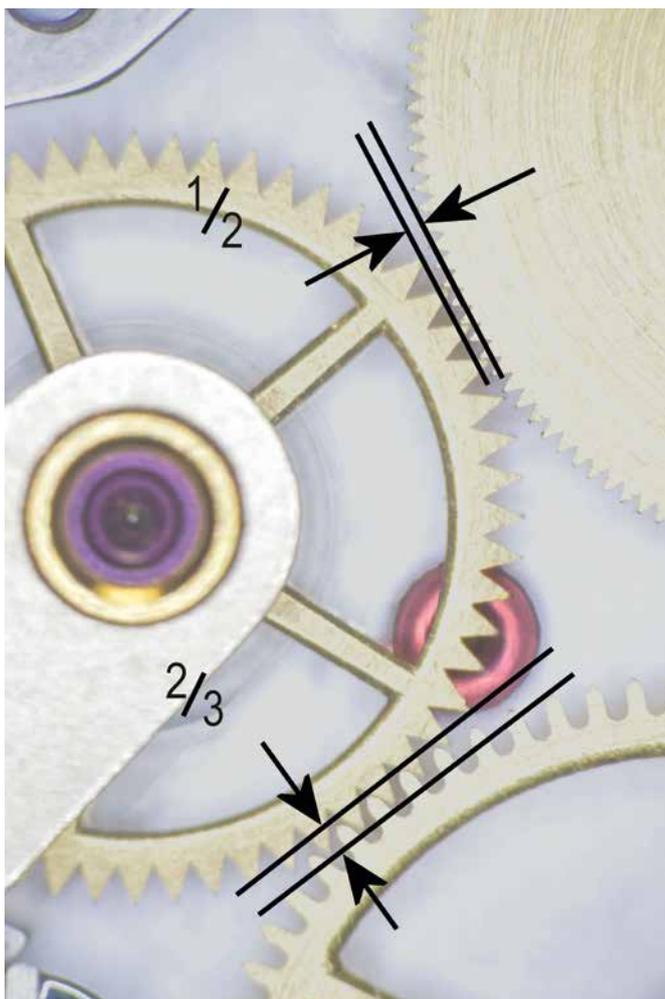


Figure 10. Adjusting depth of engagement of chronograph runner and driving wheel.

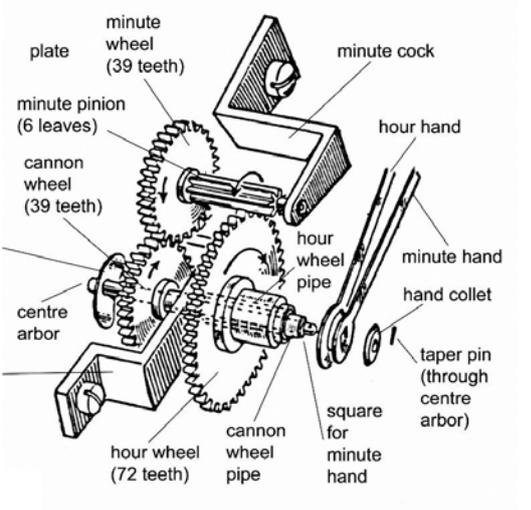
to allow the minute recording jumper to complete the action, ensuring the jumper remains located between the same teeth to make sure the minute recording hand is exactly on the zero mark on the dial, also ensuring consistency between stopped and zero.

The adjustment may involve removing material from the hammer face, particularly on new hammers fitted to the Lemania calibres (usually with an India or Arkansas stone) often referred to as 'grinding the hammers in'. This could necessitate altering the angle of the minute recording hammer face. The faces should have a polished finish to reduce friction during the hammer function.

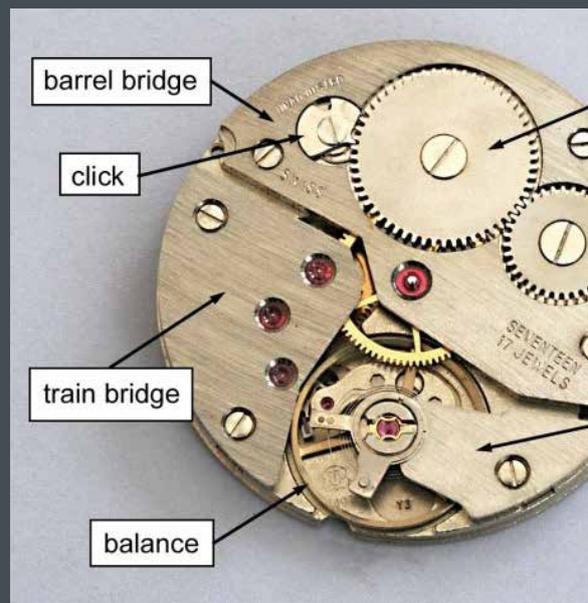
The Zenith chronograph has an eccentric cam for this adjustment, **Figure 8**.

One should also check the hammers are clear of the recording wheels and bridges during both actions (engaging and disengaging).

The depth of the chronograph driving wheel and clutch wheel can be adjusted by the clutch pivot eccentric, **Figure 9**. The depth should be two thirds the depth of the clutch wheel teeth, **Figure 10**. The depth of the clutch wheel and chronograph runner can be adjusted by the clutch stop eccentric, **Figure 9**. The depth should be approximately half the depth of the runner teeth, **Figure 10**.



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