

Brewer Instrument Leveling SOP

The Canadian Brewer Spectrometer Network

Réseau Canadien de spectrophotometric – Brewer

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1. Purpose

To establish a consistent method to level the Brewer instrument such that its optics are level and the tracker's rotation axis is perpendicular to the Earth, ensuring accurate measurements.

2. Scope

This procedure applies to all technicians responsible for installing, maintaining, or recalibrating Brewer instruments mounted on adjustable tripods. Because the instrument top is slightly crowned and tracker surfaces may not be perfectly perpendicular to their shafts, levelling must be performed using an adjustable bubble level and tripod feet.

3. Overview

The Brewer's optics and tracker must be levelled together. Since neither the Brewer's top nor the tracker's top can reliably serve as absolute reference surfaces, the instrument is levelled by iteratively adjusting both the bubble level and the tripod feet until the bubble remains centred throughout 180° rotation. In this process, the instrument and the level are jointly brought into alignment. Each Brewer-tracker pair must remain matched, as the Brewer's internal optics are aligned using the tracker's alignment pins, forming a calibrated instrument pair.

4. Procedure

With the Tracker power off:

1. Orient the Brewer to face roughly south, but straight out one leg. Stand on the opposite side directly between the other legs. You will be standing at the back of the Brewer.
2. Place the level on top of the instrument and using the red thumb screws on the level adjust the level until the main bubble across its length and the smaller level on its width are both centered.



3. Rotate the Brewer 180 degrees (slowly so the level does not “walk” across the top because of vibration). The Brewer will now be facing you and both bubbles on the level will likely not be centered. We will focus on the larger level travelling the length of the level. Adjust the centered red thumb screw until the bubble has moved halfway from where it currently is to the center point.
4. Now adjust the tripod feet to make the bubble centered. You are adjusting both tripod feet on either side of you (East and West), to move the bubble in the direction desired. Loosen the locking nut to allow the foot bolt to turn. Move one foot up and the other down. It often takes only a partial rotation on each side to move the bubble as desired and as you get closer to level, only a minute portion of a turn becomes necessary.



5. Rotate the Brewer back 180 degrees. The Brewer will now be facing away from you and the bubble on the level might be still off center but closer than before. We will focus on the larger level travelling the length of the level. Adjust the centered red thumb screw until the bubble has moved halfway from where it currently is to the center point. If the smaller level is substantially off, the front leg can be adjusted to something more reasonable but do not focus on this direction at this time.
6. Now adjust the tripod feet to make the bubble centered. You are adjusting both tripod feet on either side of you (East and West). To move the bubble in the direction desired. Loosen the locking nut to allow the foot bolt to turn. Move one foot up and the other down. It often takes only a partial rotation on each side to move the bubble as desired and as you get closer to level, only a minute portion of a turn becomes necessary.
7. At some point the bubble level will remain centered even after the instrument is rotated 180 degrees. At this point the level is now leveled. Tighten the locking nut on both the east and west feet, being sure the foot bolt does not rotate as the nut is secured.

8. Now rotate the instrument 90 degrees. This time leave the level unadjusted. Adjust the south leg to bring the bubble to the center of the level.
9. Rotate the instrument back 180 degrees and check if the bubble is still centered. It should be but if not repeat the rotation to double check this position. Once centred, tighten the last locking nut