PLI Support Guide: Robotic Total Station Field Calibration

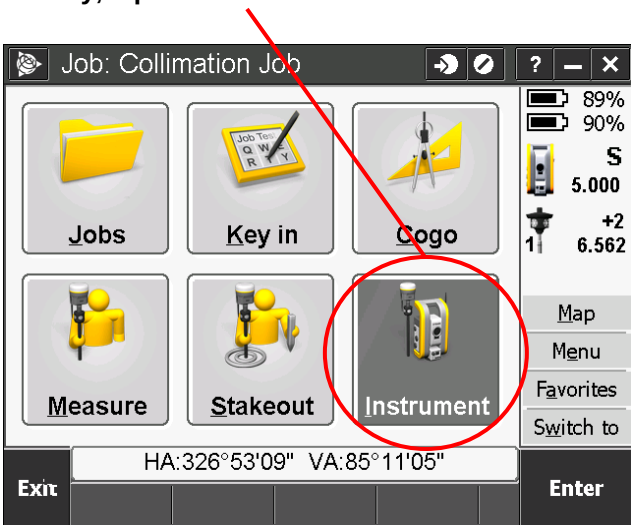
Summary: This manual will instruct you on how to properly calibrate your Trimble Robotic Total Station using Trimble Access.

Your instrument must be setup on a good tripod with a wide stance, and you will need a clear line of sight on relatively flat ground for 300+ feet.

You will also need a clearly defined target(s) (for pointing only, good survey targets or distinct existing features like corners of signs, corners of windows, etc. are acceptable).

You will also need the prism that you will be using.

1. **In Trimble General Survey, tap "*Instrument*."**



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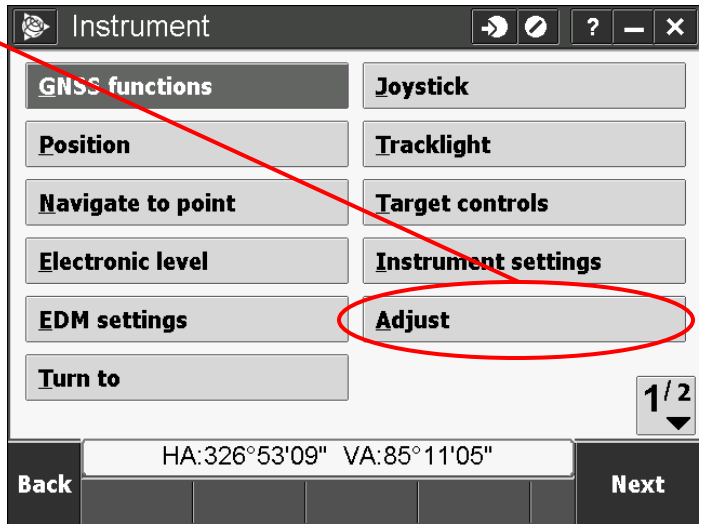
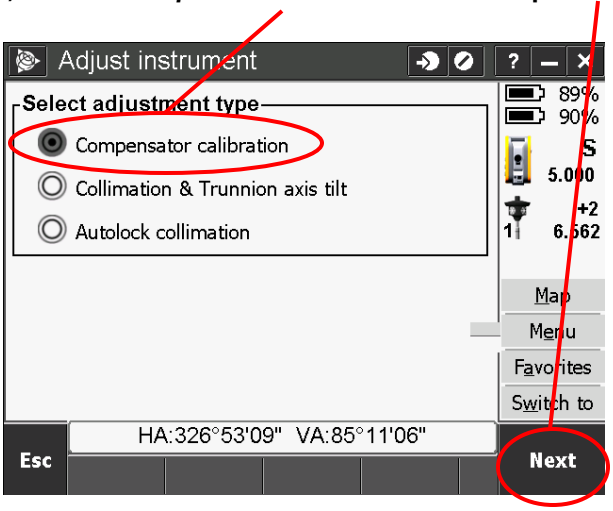
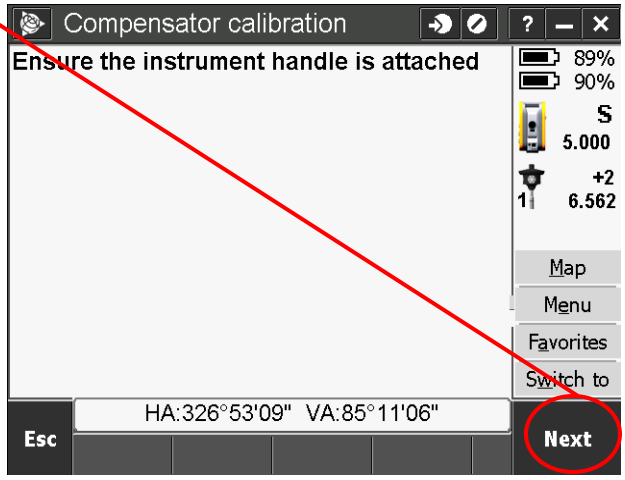
2. Tap "***Adjust***"



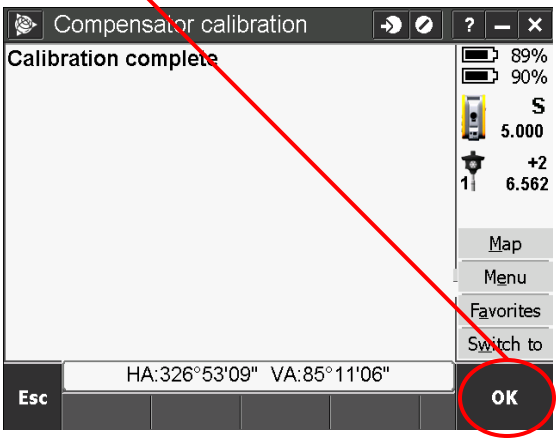
3. **The first adjustment that you should do every time you do any other calibration is the Compensator Calibration. This calibration calibrates the electronic level to read consistently when the instrument is turned. Make sure your instrument is leveled and that you have a battery installed in the side cover of the instrument before you perform this operation. Then, select "*Compensator calibration*" and tap "*Next.*"**



4. **Tap "*Next*."**



5. **The instrument will turn automatically and perform the calibration. When it is done, tap "*OK*."**



6. **After the Compensator Calibration, you will do the Collimation routine. The optical collimation routine collimates the optical Horizontal axis (HA) and Vertical axis (VA) to those of the Horizontal and Vertical circle of the total station. Assuming all other axes are true, a successful optical collimation will mean that what you are sighting with the reticle is in line with the total station's HA and VA angular readings. Optically collimating one's instrument is a critical component of ensuring data integrity and repeatability for the HA, VA and SD readings.**

   Select a sighting target roughly 300+ feet away as close to 90 degrees vertical as possible. You will take several measurements in each instrument face (*Face 1*, then, *Face 2*).

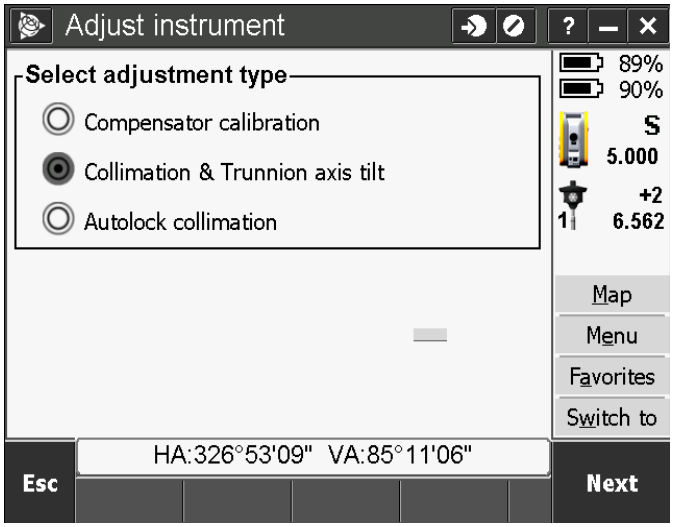
   Select a target that can be precisely sighted repeatedly (Distinct existing features work well, such as a corner of a sign, or window, or building, etc.). NO distance measurements will be taken.

   You will precisely sight the target for each measurement then move the crosshairs off of the target and precisely re-sight on the target for subsequent measurements.

   The procedure will be:

   - **In *Face 1*: Sight- Measure- Slightly turn off the target Repeat (a minimum of 5 times)**
   - **Change Face**
   - **In *Face 2*: Sight- Measure- Slightly turn off the target Repeat (a minimum of 5 times)**

In the following example, 3 measurements have been taken in each face.



7. **From the "*Instrument*" menu, select "*Adjust*" then select "*Collimation & Trunnion axis tilt*" then select "*Next*."**

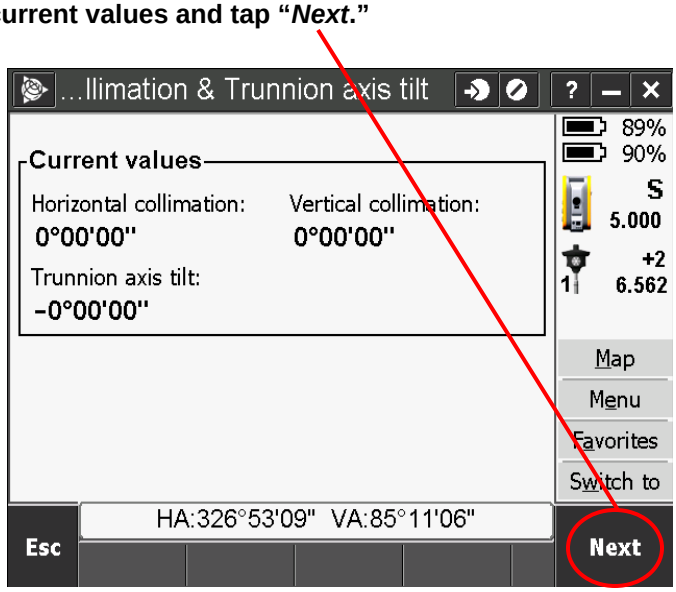
   The current Horizontal, Vertical, and Trunnion values will be displayed.

   Keep track of the current values and the new values you are getting at end of this calibration and compare them.

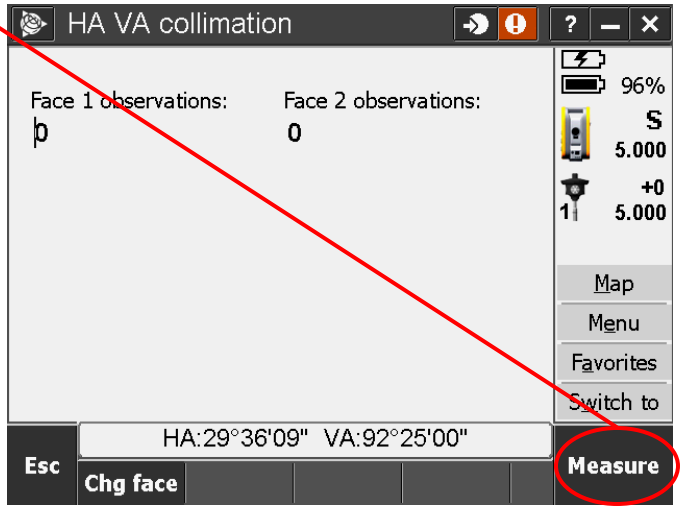
   If the values differ by 1 minute or more, do not accept the new values and repeat the collimation routine.

   If you still get values that differ by more than 1 minute or more on the 2nd attempt, then you will have to bring the instrument in for service.

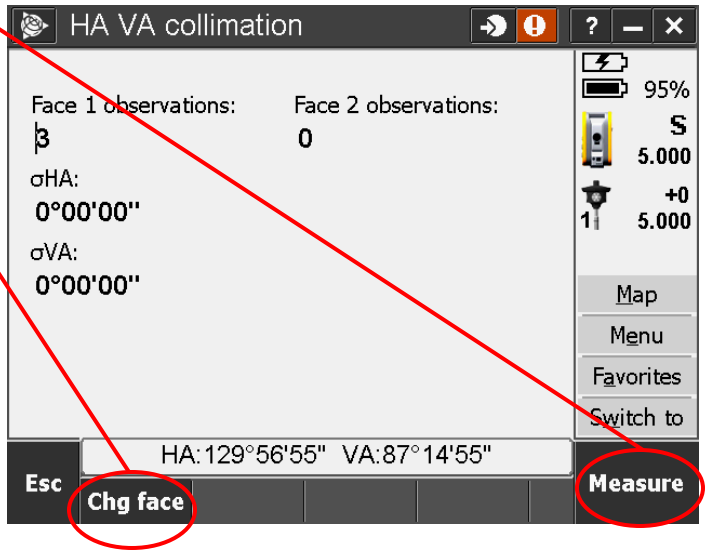
   Write down the current values and tap "*Next*."



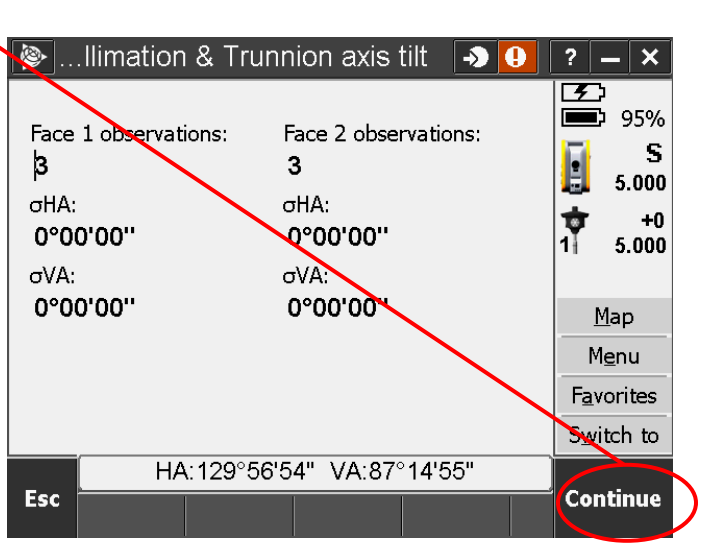
8. **Precisely sight your selected target and tap "*Measure*." Then, slightly turn off of the target and precisely re-sight the same target and tap "*Measure*." Repeat the measurement a minimum of 5 times in *Face 1*.**



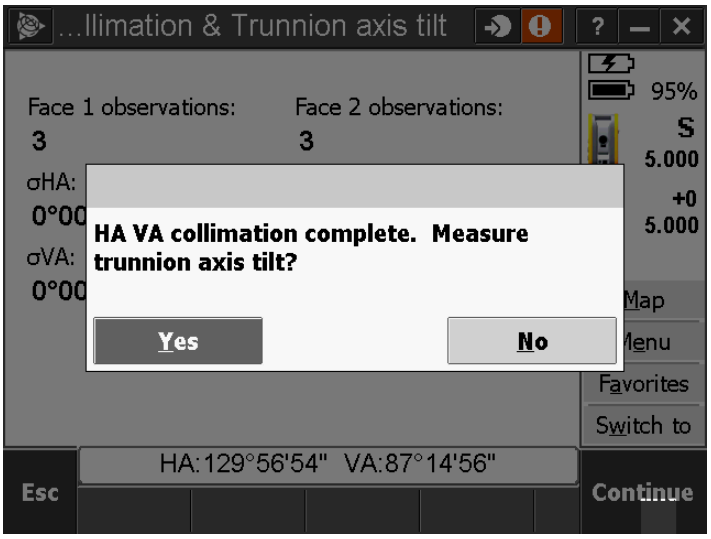
9. **Tap "*Chg face*"; the instrument will automatically flop to *Face 2*. Then, precisely sight your selected target while in *Face 2* and tap "*Measure.*" Following that, lightly turn off of the target and precisely re-sight the same target and tap "*Measure.*" Repeat the measurement a minimum of 5 times in *Face* 2.**



10. **You may see some small angular differences of a few seconds, which is normal. Select "*Continue*. Accept the new results if they are reasonable.**

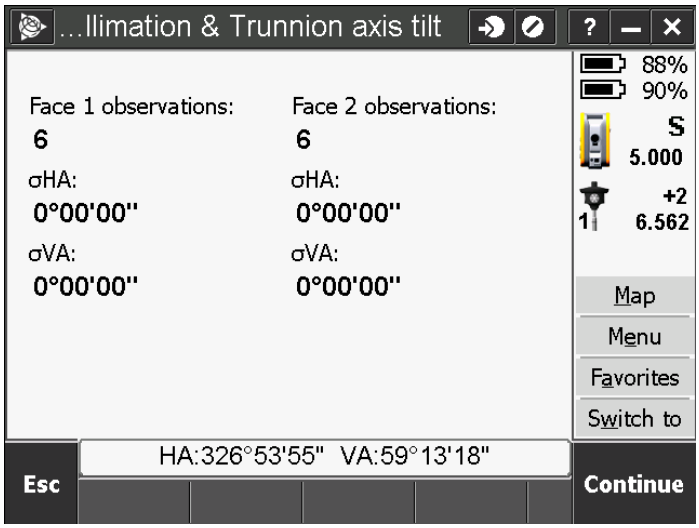


11. **After you complete the HA/VA Collimation, it will ask if you want to calibrate the Trunnion Axis tilt.**

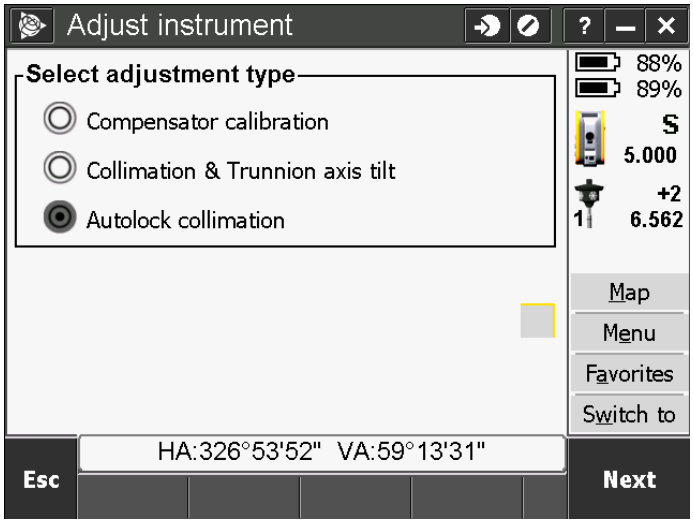


Calibrating the Trunnion Axis tilt is only necessary if you are measuring steep vertical angles (greater than 15 degrees from horizon). You will not be able to calibrate if you don't have a target that is less than 76 degrees or greater than 104 degrees from 90. The Trunnion Axis Tilt collimation routine ensures that the trunnion axis of the total station is perpendicular to the Zenith (vertical) axis of the total station. A proper Trunnion Axis tilt collimation is important to maintain the integrity of the HA when the VA differs from the horizon.

12. **The workflow is the same as performing the horizontal collimation, sight a target within the described vertical angles. You will get a warning if your vertical angle to your target is not steep enough. You will measure in both faces. Keep track of the values. Accept the results if they are reasonable.**



13. **The final calibration is the Autolock Collimation. The tracker collimation routine ensures that the tracker axis is parallel to the optical axis. This is important if you mix manual and auto-locked point collection or reference points. This routine is automatic and only needs to be initiated. The actual routine is stored in the total station firmware.**



14. **When doing the Autolock Collimation, precisely sight the center of the prism you are using at a minimum distance of 328 feet (try to keep the prism close to horizontal i.e. 90 degree vertical angle), and do this every time that you change your prism. This is an automatic calibration, so just wait for it to be done and keep track of your results per prism. Accept to store the values.**