Tips for improving Measurement Repeatability:

Repeatability should easily be within .0005 for lift and within .25 deg for duration and events. If not, check some of these testing tips:

- For roller lifters, the roller bearings could change slightly as the roller rolls. If you have a roller lifter to waste, force some shim stock between the roller and the lifter to prevent rolling. Also, how the lifter roller axis aligns with the cam axis (they should be exactly parallel) will affect test-to-test repeatability. We have the Universal Roller with a ball which eliminates the 2 potential problems above.
- Rotate the cam relatively slowly and smoothly. The software is designed to be very forgiving for erratic movement. Stopping and starting should not be a problem. However, going too fast over the lobe will produce errors. Going faster on the base circle is typically not a problem. The "warnings" the program gives about rotating the cam too fast are overly cautious. Most users turn off these warnings in the Preferences section.
- Be sure the linear encoder's arm holding the lifter is always perpendicular (90 degrees) to the cam axis. This means it is as close to the cam as possible, and the lifter is always directly over the centerline of the cam. This is especially critical for roller lifters and when using the linear encoder's pointer directly on the cam lobe for the Virtual Follower feature.
- Be sure to tighten up the linear encoder stand when you move to the next lobe.
- Be sure the linear encoder does not top out or bottom out as it goes through the total range of motion.
- Be sure the lifter moves smoothly in the bore so its weight can keep it in contact with the lobe at all times.
- The cam should turn easily and smoothly in the "V" blocks. You may have to clean any coatings off the cam lobes for this to occur.
- Be sure the cam lobe is free from dirt, coatings and debris. New cams often come with a "break in" coating. This should be cleaned off before you can get ***accurate*** measurements. If all you need are ***approximate*** measurements, you may choose to leave this coating on the lobe.
- Be sure the linear encoder's point is setting on a flat spot on top of the lifter. We have magnets which you can place on top of lifters to provide a flat top. If the pointer is on the edge of the pushrod's oil hole, it may move to different depths as you measure the lobe.
- The rotary encoder can not slip during testing, as then you lose your degrees index. Things to check for slippage include:
    - When you are done testing a cam, back out to the main screen and note the centerline of the 2nd lobe you measured. Typically this would be the Exhaust lobe on Cylinder #1. Click on File, then Save to save your results. Then go back into the Record screen ***without*** powering down the Black Box II. If the box is not powered down and you don't re-zero it, it will retain its rotary index. Re-measure this 2nd lobe and see if the centerline comes up within .25 degrees of the first measurement. If it is way off (2 deg or more), you've had slippage or the rotary encoder has lost its index for some reason.
    - Another thing that could look like slippage. It is critical that the body of the rotary encoder be held stationary. This is done by making sure the rotary encoder's arm is held firmly to the magnet. If the magnet the rotary encoder's arm is attached to has a rough edge, and the cam is moved front to back, the arm may be in a slight notch for one lobe, and on a slight peak for the next lobe. This is not good. Also, if the encoder's cable is not helping to hold the encoder arm to the magnet, the encoder's body may be moving around.
    - Some cams do not have a large face for the rotary encoder magnet to attach to. We use a split collar to lightly clamp on the end of these cams to provide a larger face.
    - Be sure the rotary encoder is centered on the end of the cam. Slide and hold the magnet back from the encoder's index point. Place the point in the end of the cam, then slowly release the magnet. This ensures the index point is well seated into the centering hole in the end of the cam.

Check the FAQ section of our website www.performancetrends.com for the latest tips on using the Cam Test Stand.