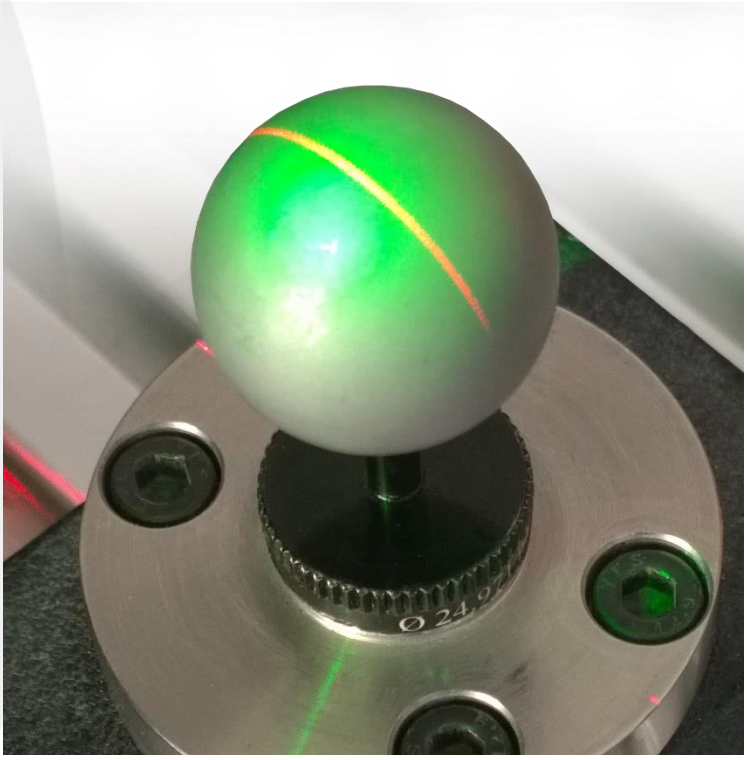
Kreon
The complete 3D scanning solutions

Kreon Scanner Positioning



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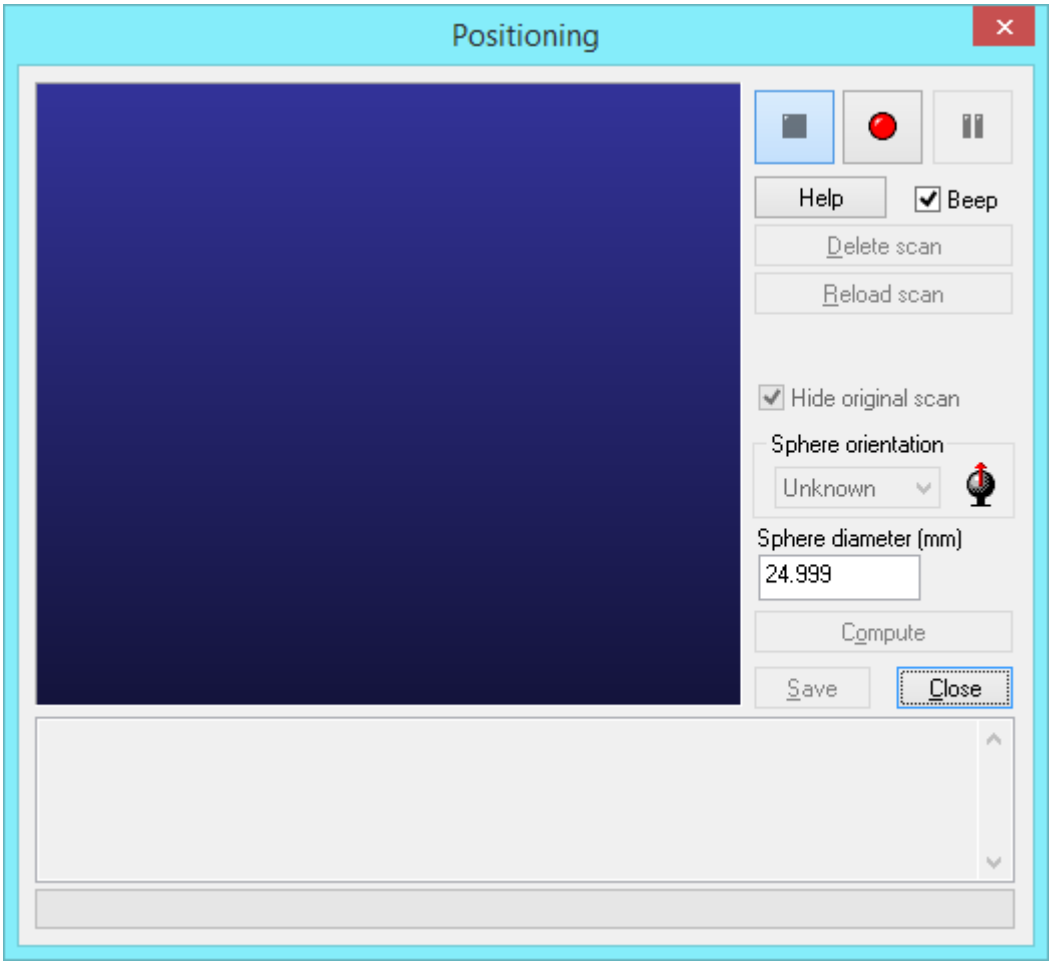
Summary

1 INTRODUCTION

After mounting a Kreon scanner on a machine (CMM or arm), the system must be calibrated. We call that procedure “Positioning” because it computes how the scanner is positioned on the machine.

First, open the positioning window (in Polygonia, open menu “Services > Positioning”; otherwise, please refer to the plug-in manual). The Video Settings window will open, too. Make sure that the “<Default>” video settings are selected. You may then slightly increase the integration time up to “1/500”, if necessary.

Then, enter the datum sphere diameter (in millimeters) in the corresponding field.



The procedure consists in scanning the datum sphere from various positions and distances (from the top to the bottom of the field of view of the scanner).

You won’t be able to start scanning (red “Record” button) if a previous scan is visible. If so, delete the scan, first.

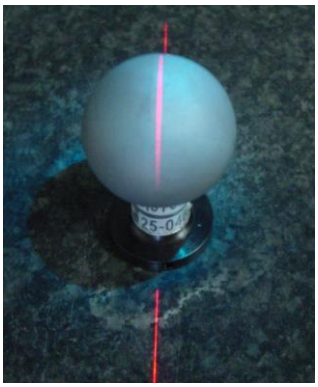
Then, the procedure depends on whether the scanner is mounted on an arm, which allows you to scan in every possible orientation around the sphere, or a CMM, where the scanning orientation is fixed.

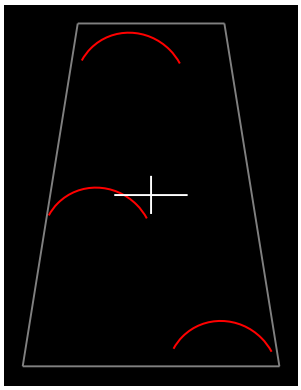
2 POSITIONING WITH A 3-AXIS CMM

Unless you are using a plug-in that moves the machine automatically, you will have to perform manually three scan passes, at three different heights (top; middle; bottom) above the sphere.

For each scan pass:

- Move the machine to bring the sensor above the sphere so that the laser line is centered (left-hand image below).
- Then, adjust the distance and shift to the left or right to move the laser to one of the three positions shown in the right-hand image. Note that the three passes are not aligned vertically.
- Move the machine/scanner in the opposite direction of the pass you plan to perform until you do not see the sphere any more in the Video Settings window.
- Press the “Record” button (red spot), then move the machine to perform the pass over the whole sphere.
- Stop moving the machine; press the “Pause” button (two vertical bars), then proceed to the next pass.
- At the end of the third pass, press the “Stop” button (black square) after or instead of “Pause”, then “Compute” (see section “Results” for the end of the procedure).



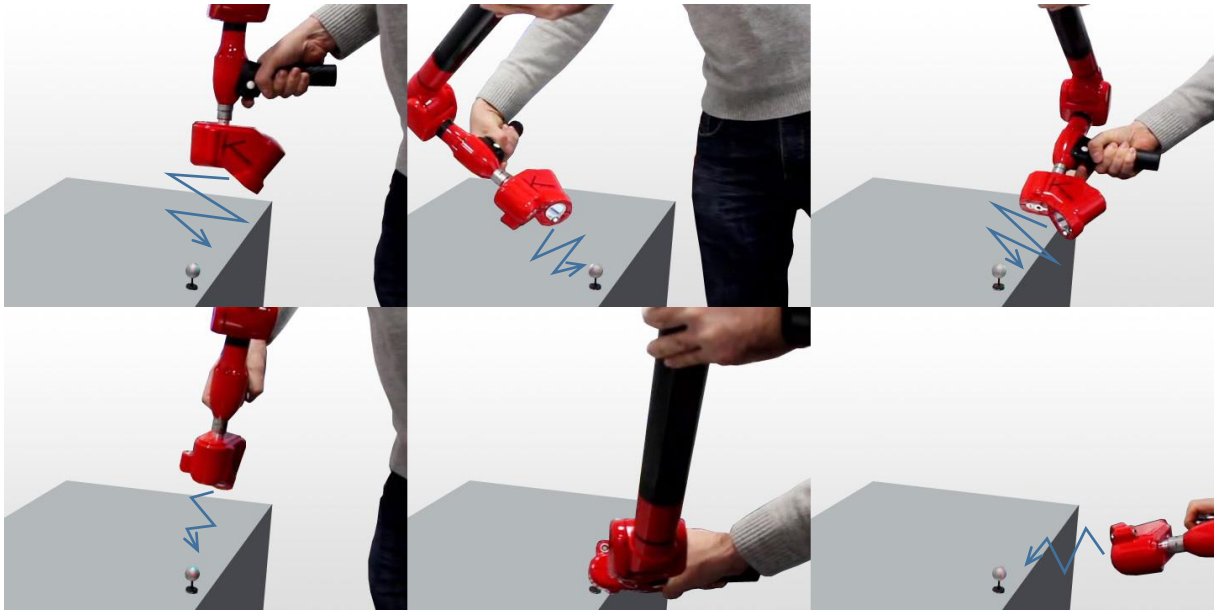


For example, let’s assume that the vertical axis is Z and the laser line is aligned with axis Y. Placing the scanner above the sphere and adjusting the distance for each pass serves to find the Z and Y positions. Therefore, the three passes will be along the X axis and will start from one side of the sphere and finish at the other side of the sphere. So, before scanning each pass, you will have to move the machine along the X axis (in any direction) until you don’t see the sphere any more then start scanning and move in the other direction along the X axis to scan the sphere until you don’t see it any more.

3 POSITIONING WITH AN ARM

With an arm, it is required to scan all around the datum sphere to have a good representation of all the arm orientations and scanning distances that you could meet while scanning parts later.

Scanning the sphere from four sides plus two orientations on the top (see illustration below) gives a good representation of the sphere, especially if you also move forward or backwards while scanning to cover as much of the field of view of the scanner as possible.



For the user's convenience, pressing the arm buttons has the same effect as using buttons "Record" and "Pause".

4 RESULTS

As you could see while scanning, unless you already performed a valid Positioning, the scanned data might not look like a sphere until you compute the new positioning. This is completely normal.

However, after the computation of the positioning, you should see the sphere correctly, possibly with some remains of the surrounding elements. If you notice laser lines that do not seem to be part of the sphere (as if they belong to the sphere support or the workbench) you may select them by holding the <Shift> key while pressing the left mouse button to draw a frame (or a polygon) around the selection; then press the <Delete> key to remove them; and finally press “Compute” again to get a more accurate result.

The displayed results contain two important values for the user:
- The Sphere diameter indicates the computed diameter of the sphere, in opposition to the theoretical diameter you typed in. If the difference is too big, it could be either because you did not perform the positioning correctly, or you entered the wrong diameter, or the scanner or machine may need recalibration (annual recalibration is recommended for Kreon scanners).
- The other important result is the standard deviation. It depends on the scanner model and the machine (CMM or arm) precision but it usually ranges from 0.025 to 0.080. If you get a high standard deviation, check whether there are some remaining data that do not belong to the sphere.

Finally, do not forget to save the Positioning with the “Save” button before closing the Positioning window.

5 TROUBLESHOOTING

5.1 I GET BAD POSITIONING RESULTS

Problem: Despite my efforts to follow the Positioning instructions, I get bad results, or the computation does not even succeed.

Solution 1: Check that you selected the correct scanner calibration CAL file. If the scanner has already been recalibrated, make sure that you are using the latest version of the calibration file. Same remark for the arm calibration data if they are contained in a file (e.g. TAB file for Kreon arms).

Solution 2: Check that the scanner is firmly attached to the arm or CMM and that the whole system is stable.

Solution 3: Check that the arm/CMM works properly by probing instead of scanning. If it does not work fine, the problem comes from the arm/CMM.

Solution 4: A scanner or arm/CMM recalibration might be necessary. Please contact your reseller or directly Kreon Technologies Technical Support (techsupport@kreon3d.com) or After-Sales department (aftersales@kreon3d.com).

5.2 I GET GOOD POSITIONING VALUES BUT BAD SCANNED DATA

Problem: The positioning values seem good but the scanned data looks wrong.

Solution 1: The video settings might be inappropriate for the part you are scanning. Please refer to the “Video Settings and AQC” documentation.

Solution 2: Sometimes, with arms, when you the user scans just enough data to pass the computation, but not enough to represent the sphere in the whole space, the standard deviation may look good but the positioning will only be valid when scanning in the same orientations used for positioning. Try positioning again with a better variation in the orientations and distances.

Solution 3: The arm or CMM may be defective in a particular position that you did not reach while calibrating the system. Please contact your reseller or directly Kreon Technologies Technical Support (techsupport@kreon3d.com).