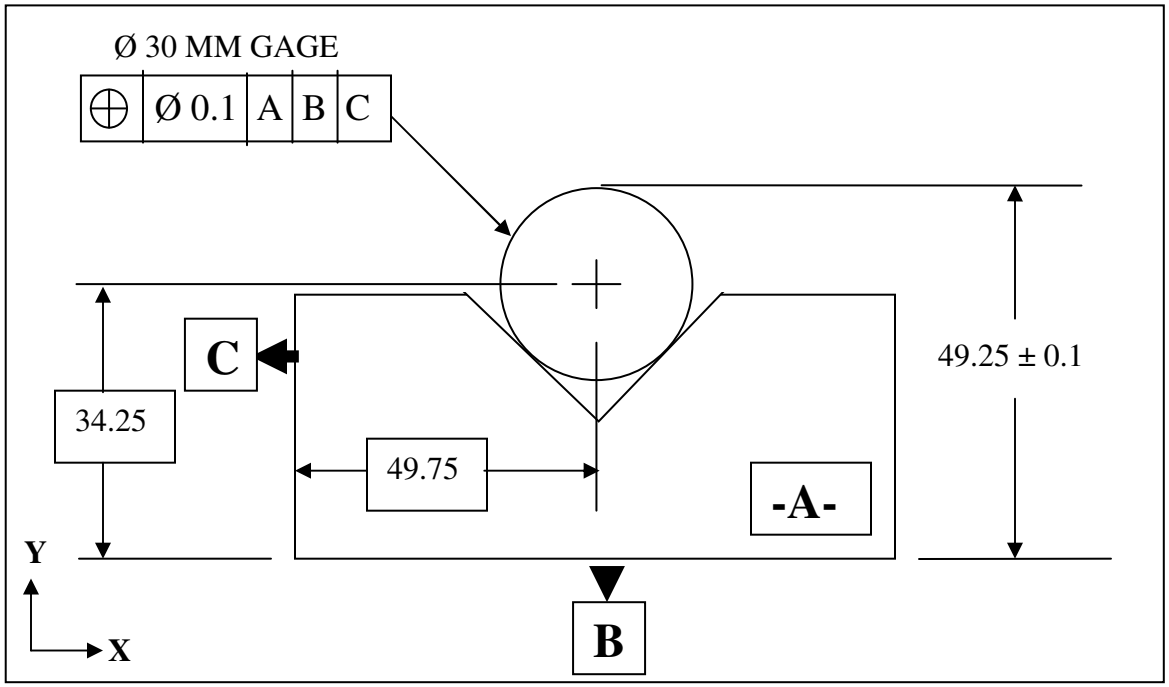
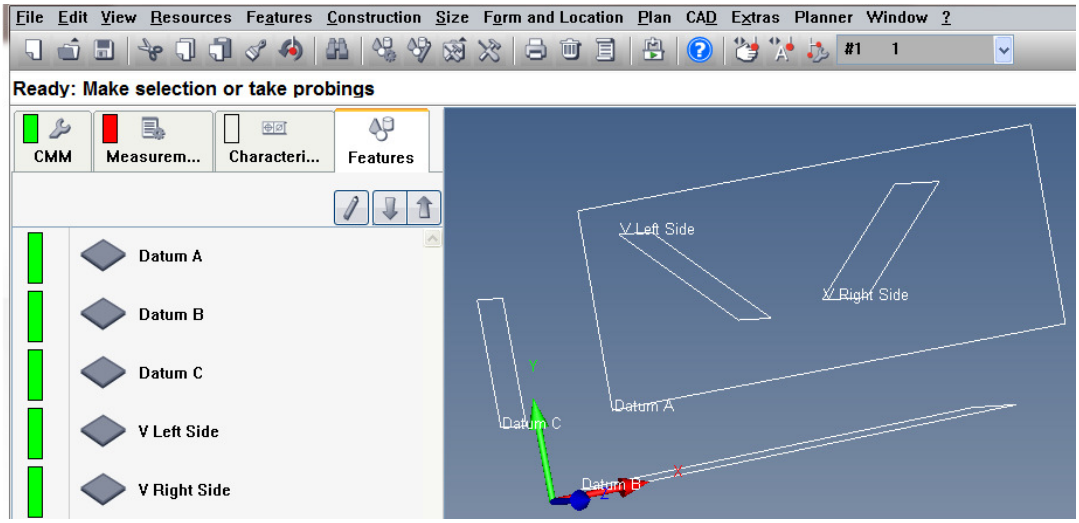
Evaluation of Gage Ball/Pin Gage Dimensions in Calypso

Example:

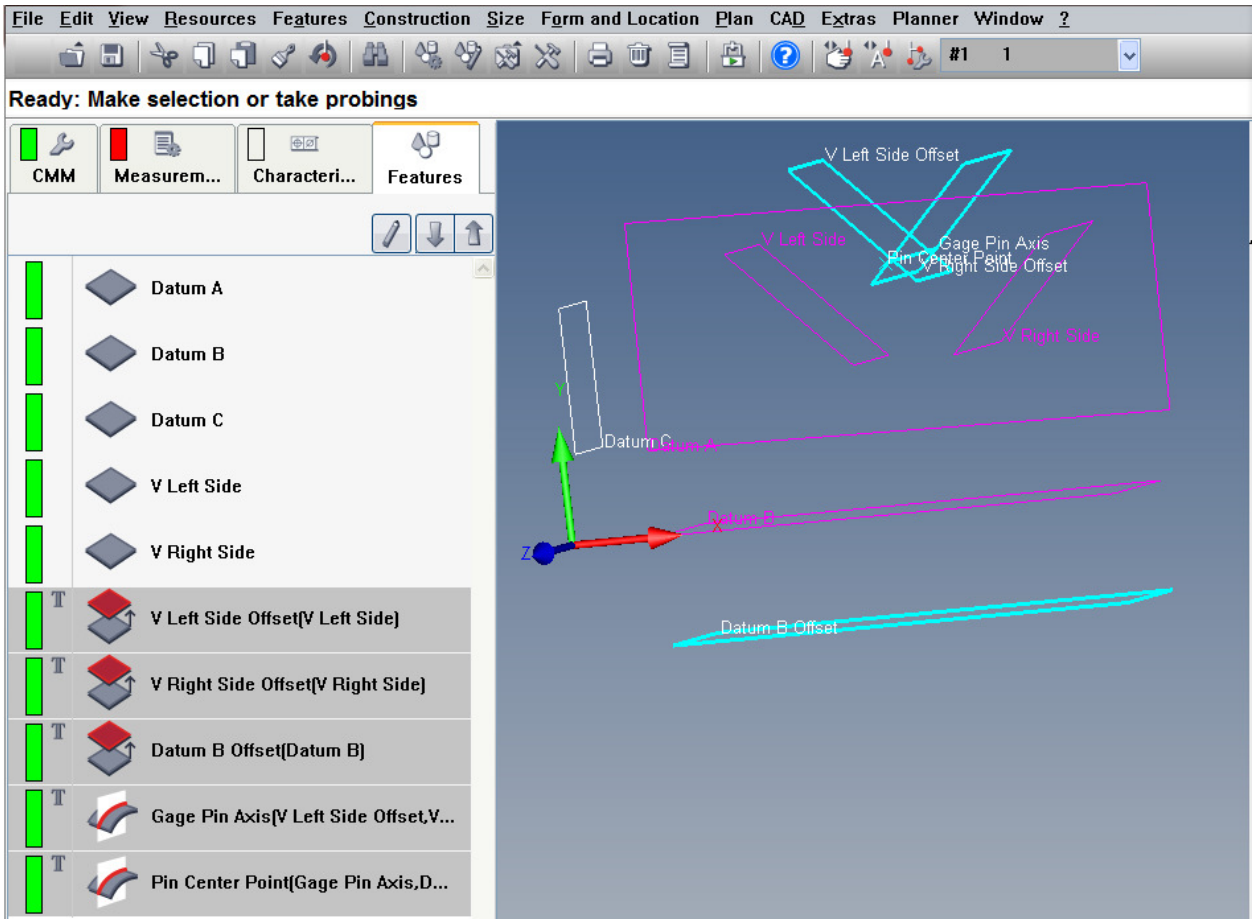


Measure:



- Top Plane (Datum A)
- Front Plane (Datum B)
- Side Plane (Datum C)
- Left side of V Groove as a plane
- Right side of V Groove as a plane

Create Constructions:

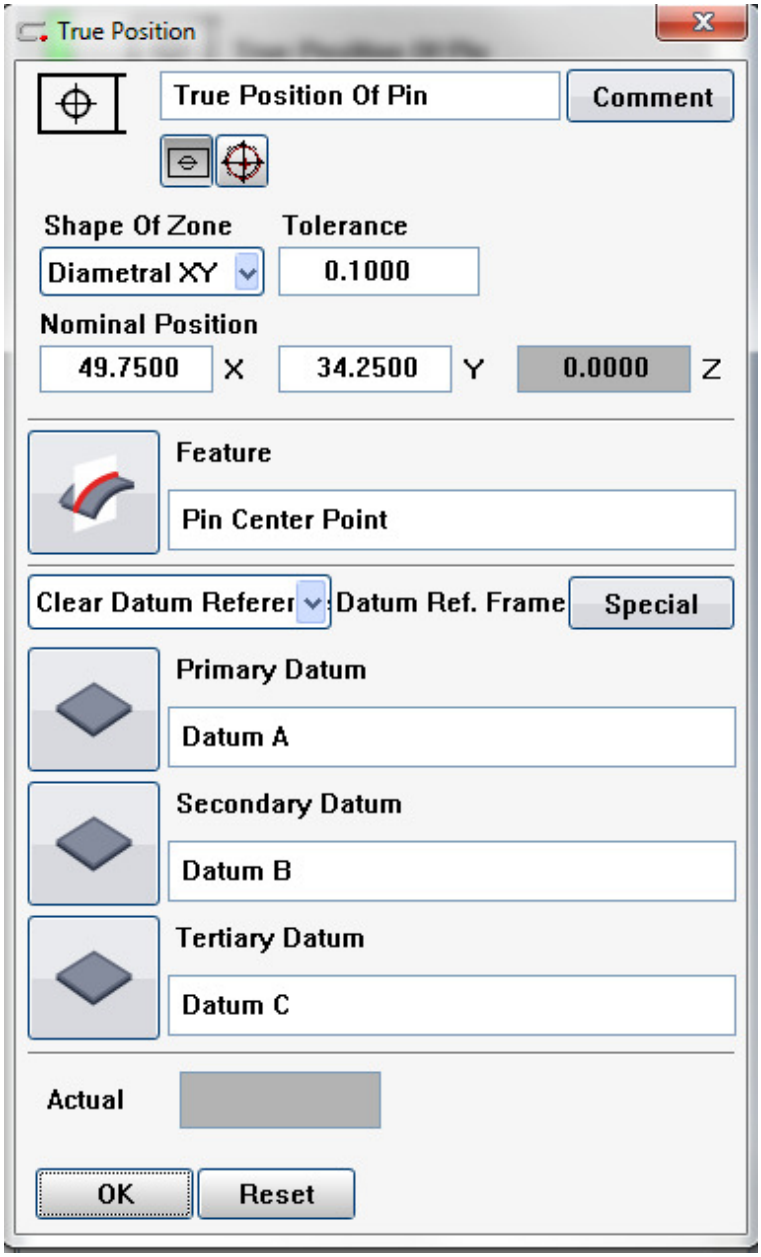


- CONSTRUCTION>PLANE WITH OFFSET. Offset the Left Side of the V Groove by the Gage Pin Radius.
- CONSTRUCTION>PLANE WITH OFFSET. Offset the Right Side of the V Groove by the Gage Pin Radius.
- CONSTRUCTION>PLANE WITH OFFSET. Offset the Plane from which the “Distance over Pin” is measured (this case Datum B) by the Gage Pin Radius.
- CONSTRUCTION>INTERSECTION. Intersect the Offset V Left Side with the Offset V Right Side. This result is the centerline axis of the Gage Pin.
- CONSTRUCTION>INTERSECTION. Intersect the Centerline Axis of the Gage Pin, created above, with a crossing plane (this case Datum A) to get a point.

Create Characteristics:

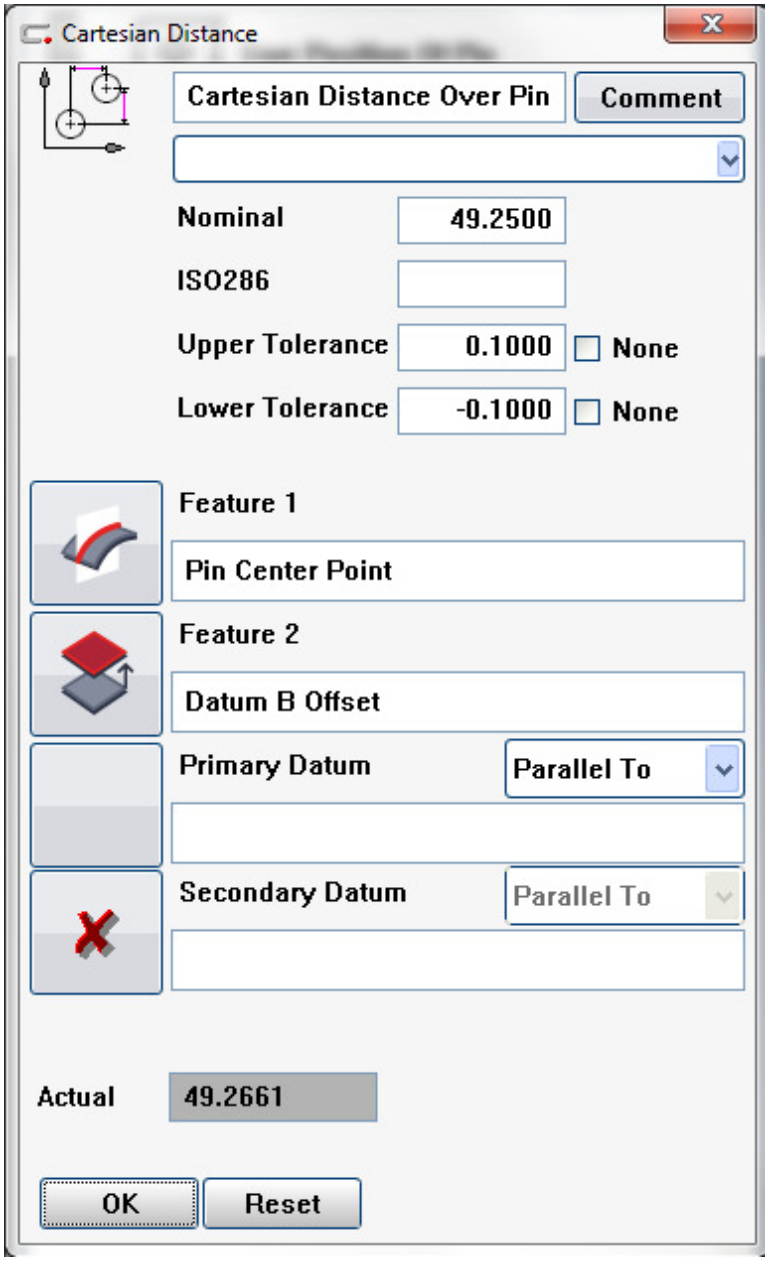
True Position of Center of Gage Pin:

- FORM AND LOCATION>TRUE POSITION.
- Enter the second intersection (the point on the gage axis) as the Feature and the top plane, front plane, and left plane as the Datums in the True Position window.
- Edit X and Y basic dimensions to match the print (49.75, 34.25).
- Enter your True Position tolerance from the print (0.1).

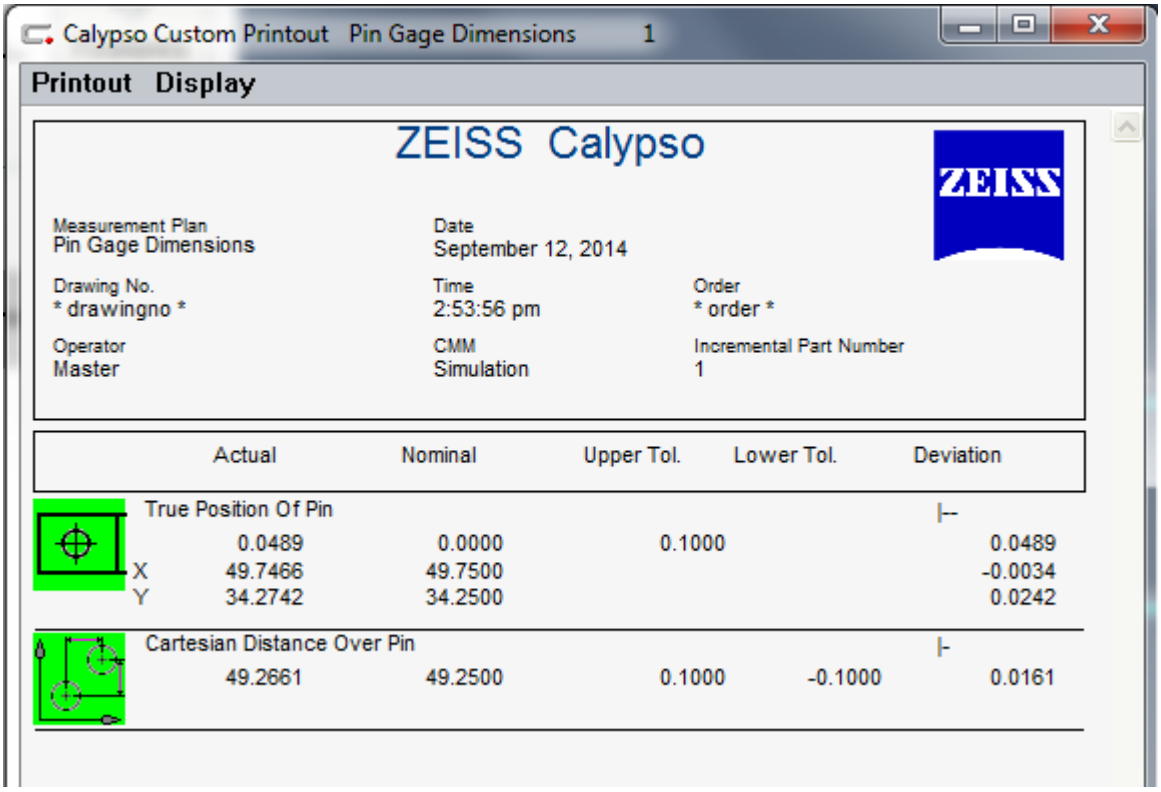


Dimension over Gage Pin:

- FORM AND LOCATION>DISTANCE>CARTESIAN DISTANCE
- Enter the second intersection, the point on the gage axis, as the Feature 1 and the offset front plane in the Cartesian distance window.
- Enter your Nominal (49.25) and Tolerances (± 0.1).
- Note that Datums here are unnecessary because the second feature of the distance is a PLANE. The result of a Cartesian distance between any feature and a PLANE is always the shortest distance perpendicular to that plane, so no datums are needed.



Understand Report:



- Most Gage Ball and Gage Pin measurements can be calculated theoretically without using a physical Ball or Pin. Constructions and formulas (if necessary) can handle most print dimensions referenced to a Gage diameter. In this case, since the Gage was sitting in two slanted planes, the theoretical center of the Gage can be found by offsetting the planes by the Gage radius.

- True Position can be reported on the intersection point of the Gage axis and the top surface. Below is the Calypso Custom Printout with Additional Position Result turned on (RESOURCES>CHARACTERISTIC SETTINGS EDITOR>ADDITIONAL POSITION RESULT> Set To ON.

- The Distance over top of the Gage Pin can be found in many different ways. The easiest is to offset the surface the distance is measured from by the ball radius and use a Cartesian Distance to report the distance from the Gage center to the offset plane.