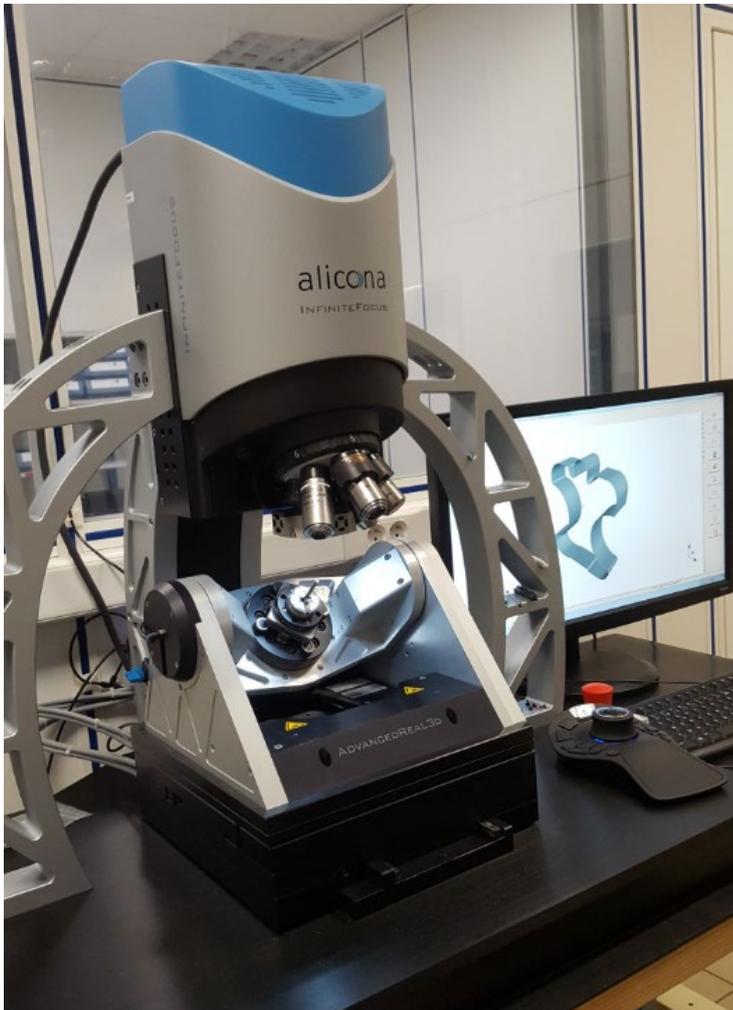


Bruker alicona



Application Note

Micro Switches

Bruker Alicona is a leading global supplier of optical metrology solutions based on the principle of Focus Variation.

Focus Variation works based on moving a focal plane over a surface and collecting robust 3D data which can then be used to measure geometric form and surface finish from a single optical sensor.

Measurement processes can be fully automated and provide GD&T measurement capabilities across all industrial & medical sectors.

The systems are in use in Industry, Industrial Research, Universities and production facilities globally.

www.alicon.com

Introduction

In this issue, we report on the use of Optical Metrology at C&K switches based in France. C&K manufacture a wide range of micro switches used in many applications world-wide, they offer more than 55,000 standard products and 8.5 million switch combinations in many different designs, details can be seen at <https://www.ckswitches.com/products/switches/> and some are illustrated below. They are used in the industrial, automotive, consumer electronics, telecom, space and medical sectors.



All these switches, and other products from the C&K product range, have a requirement for the accurate measurement of both micro finish and micro geometry. Without these being accurately measured switches could fail in use or become stuck in an inoperable condition.

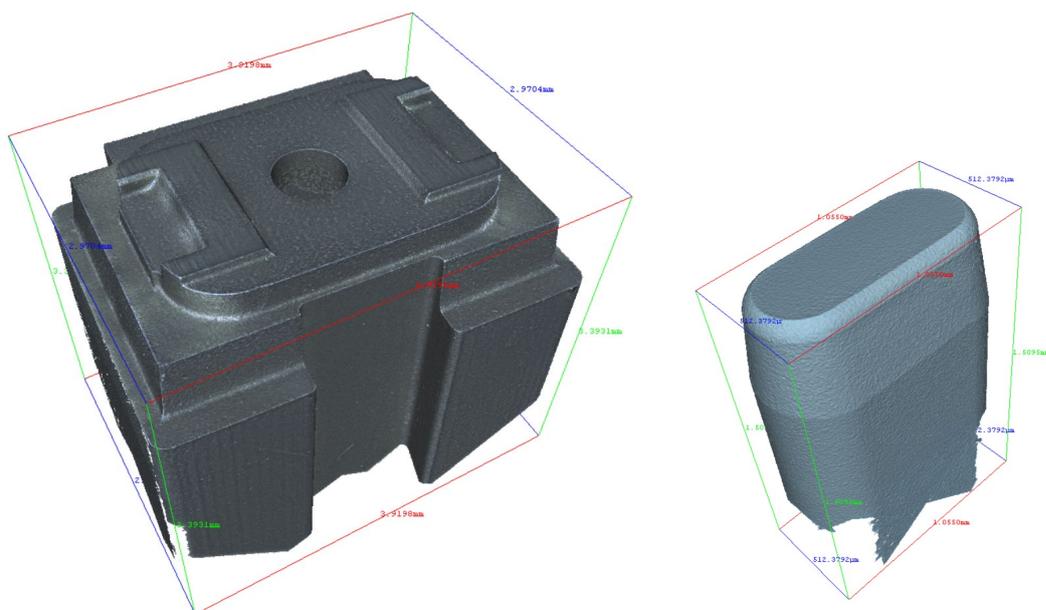
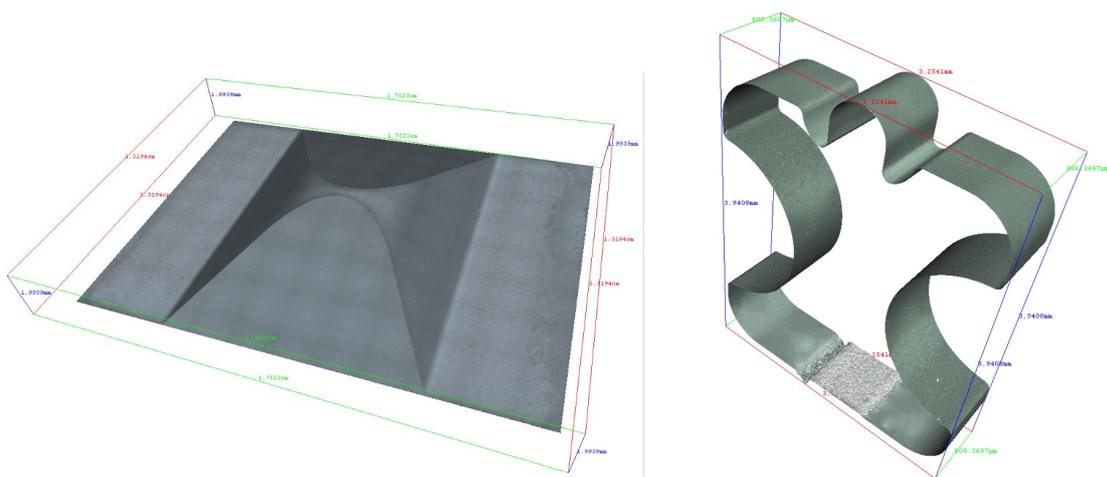
Using the Bruker Alicona InfiniteFocusG2, 200 x 200 with an advanced real 3D RotationUnit (shown below with Laurent Gagey of C&K) they have been able to improve quality in the manufacture of these switches. The image on the monitor shows the complexity of these small parts that require data verification.



Measurement Tasks

The main application is the validation of machined parts in wire EDM, sinker EDM or HSM (High Speed machining), by fitting and comparing the scanned datasets with the nominal shapes resulting from CAD files. The tolerances for the realization of these elements are generally in the range of a few microns. By measurement of the stamping tools & dies used to manufacture these products they can control tool life by the measurement of wear against CAD models.

These components are very small, as can be seen in the 3D models produced by the InfiniteFocus in the illustrations below.



These components, according to Mr Gagey, are very challenging to measure, they exhibit shiny surfaces, a complex form and require the fusion of several 3D data sets with high precision. The Bruker Alicona system, fitted with the Advanced Real3D rotation device achieves this automatically producing high quality, dense and robust 3D models that can easily be compared against CAD data.

“The main advantage of the system is that it allows the control of a complete shape without the constraint of separating it into distinct geometrical elements. Daily, it allows us to adjust the machining parameters of our production resources down to the value of one micron”, says Gagey.

Another feature of this optical metrology system is the ability to measure surface finish directly on the 3D model created by the system. C&K use line-based measurement as the roughness is a measure created by the tolerances of the machining operation, as a result it is orientated in each direction therefore areal based measurements are not needed.

Summary

The measurement of features on these electronic components is easily achieved using Optical Metrology.

This technique offers many advantages over other techniques that could be used, these are:

- Only one measurement system is required for all the required measurements.
- The measurements are visualised and stored in a database that can be readily retrieved in the event of product issues.
- There is no potential for surface damage that can be caused by stylus-based instruments.
- The instrument user does not require any knowledge of metrology to make the measurements.
- All measurements are fully traceable to international standards