Measurement Automation

The automation interface AutomationManager enables repeatable measurements without any prior metrology-knowledge being required.

What has been standard in the tool industry with the EdgeMaster series for a long time already, now applies for all cross-sector optical Alicona measurement systems for the high-resolution measurement of roughness and form. The automation software "AutomationManager" allows for fully automated measurement of complex component geometry in production. Measurement devices can be effectively operated without any prior knowledge of metrology being required.

The AutomationManager is a software platform that makes the automated and user-independent measurement and evaluation of micro-precision components or micro-structured surfaces on large components possible. The process is based on the interplay between an administrator, who defines the measurement program, and operators in the production area. The operator starts the pre-programmed measurements at the touch of a button, the selection of the components to be measured is done by means of a drop-down menu or barcode scanner. The measurement and evaluation of form and roughness parameters runs automatically, the worker has no influence on the measurement result.

An administrator who configures the measurement series off-line, will be guided through three phases of the measurement process. The first phase is to determine the measurement areas on one reference component that can be both a real component, as well as the corresponding CAD data set.

CAD CAM connection

A CAD CAM connection makes it possible to define the measurement points, measurement direction etc. directly in the CAD file. Tilt angle, travel direction in XYZ, as well as rotation angle are automatically calculated and synchronized with the AutomationManager. A simulation makes it possible to create a preview of the measurement process to be carried out, and so ensures a safe and secure measurement planning. The virtual operation of the Alicona measurement systems comprises the entire handling, from the positioning of a component through to the determination of the measurement area in 3D. This allows manufacturers to integrate the measurement technology already into the design phase, which is a significant contribution to the implementation of 3D metrology within the entire production chain.

Following the definition of the measurement areas, it is specified which parameters are to be evaluated. The administrator defines a number of profile based (Ra, Rq, Rz) and areal roughness parameters (Sa, Sq, Sz) to evaluate both dimensional accuracy and surface state of components. Characteristics such as dimensions, distances, angles, concentricity, flatness, as well as deviations from form and position tolerance can be evaluated.

In the final step, the administrator configures the measurement report according to individual requirements and saves the target values wanted, which include OK/not OK determination.

It is then the worker's turn. It is usually an operator without any knowledge of measurement technology in the production area, who simply presses a button in order to start the pre-set measurement programs. Measurement positions are automatically controlled and the pre-programmed parameters are measured automatically, without any influence from the user, enabling repeatable measurements. At the end, the worker receives a measurement report containing OK/not OK data.

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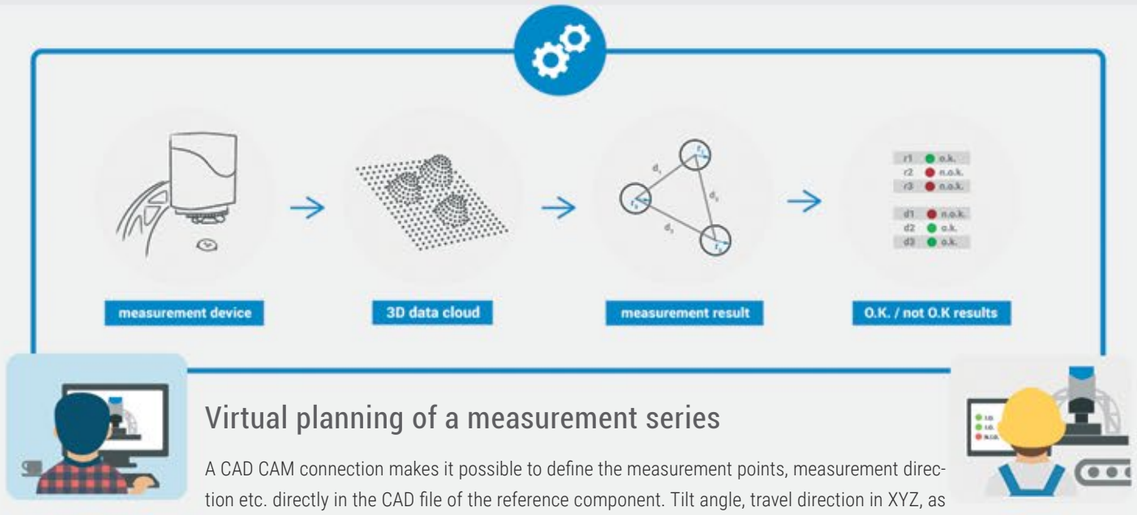
"Full measurement automation, as it is provided by Alicona´s Automation Manager, enables us to meet our customers´ requirements for repeatable measurements of components with tightest tolerances and highest manufacturing accuracy."

KENDRION
WE MAGNETISE THE WORLD

Stefan Steimle,
Head of Quality Management,
Kendrion (Germany)



Virtual planning of a measurement series

A CAD CAM connection makes it possible to define the measurement points, measurement direction etc. directly in the CAD file of the reference component. Tilt angle, travel direction in XYZ, as well as rotation angle are automatically calculated and synchronized with the AutomationManager. A simulation makes it possible to create a preview of the measurement process to be carried out, and so ensures a safe and secure measurement planning.

If the AutomationManager is used in combination with a rotation unit (here InfiniteFocusG5 with the Advanced Real3D Rotation Unit), an integrated zero-point clamping system ensures that each component is clamped in a defined position that enables accurate and repeatable measuring.